Hartlib

The Essays on Husbandry by Mr. Hartlib are not so well known as they deserve; the title implies a book upon a very confined subject but he has very artfully interwove a numerous stock of general politics & national economy; with well written anecdotes of the authors that have written on Husbandry

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ESSAYS

ON

HUSBANDRY.

ESSAY I.

A GENERAL INTRODUCTION,

SHEWING,

That Agriculture is the Basis and Support of all flourishing Communities;—the antient and present State of that useful Art;—Agriculture, Manufactures, Trade, and Commerce justly harmonized;—of the right Cultivation of our Colonies;—together with the Defects, Omissions, and possible Improvements in English Husbandry.

ESSAY II.

An Account of some Experiments tending to improve the Culture of LUCERNE by *Transplantation:* Being the first Experiments of the Kind hitherto made and published in England: From whence it appears, that *Lucerne* is an Article of great Importance in English Husbandry.

The whole illustrated with *Five Copper-plates*, and *Twenty-five Representations cut on Wood.*

To which is prefixed,

An EPISTLE Dedicatory in Verse.

The SECOND EDITION, corrected and enlarged.

By the Revd. WALTER HARTE, A. M.
Canon of Windsor, and Chaplain to the Right Hon. the Earl of CHESTERFIELD.

LONDON:

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M.DCC.LXX.

WELLCOME
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Non aſſeveravi quæ vaſtitas hujus ſcientiæ contineret, cuncta me dicturum, ſed quædam: nam illud in unius hominis prudentiam cadere non poterat: neque enim ulla eſt diſciplina aut ars quæ ſingulari conſummata ſit ingenio.

Columella de Re Ruſt. L. V. p. 166. 8vo Edit. *Steph.*

VERSES

SENT TO A PERSON OF QUALITY,

WITH

THE ESSAYS ON HUSBANDRY.

O THOU, with love of agriculture ſeiz'd;
Pleaſing, and from thy own good-nature pleas'd;
Ennobled by thy birth, and from thy mind,
With *travel* poliſh'd, and in courts refin'd;
Peruſe theſe ESSAYS in thy W * * ſhades,
Repos'd near murm'ring rills and opening glades;
Theſe ſhew Thee half the ſtores that PALE's yields,
And with a double verdure cloathe the fields;
At once prolong, and multiply the ſpring,
'Till barren heaths rejoice, and deſarts ring;
'Till naked wilds are cloath'd with crops unknown,
Plants not their children, herbage not their own.

Check'd by ſtrict laws, the VAMPIRES of the earth [a]
Fall in full bloom, or periſh at their birth:
Victim to induſtry the DWALE [b] expires,
And maim'd OENANTHE' [c] ſullenly retires;
The hypocrite NAPELLUS [d] feels the ſtroke,
Wrapt up and muffled in religion's cloak;

[a] Hurtful weeds.
[b] Common night-ſhade. *Yorkſhire*
[c] Water drop-wort.
[d] Monks-hood, or fryar's cowl.

In vain the BELLADONNA [e] mercy cries :
(Whoſe crimſon-bluſh with *Tyrian* luſtre vies ;)
She pleads unpity'd, and unpity'd dies.
Whilſt hagger'd ſtep-dames ſearch for deaths in vain,
And mutt'ring curſe their once-prolific-plain . . . .

What tho' thy eyes have gaz'd on GUIDO's line,
Corregian ſoftneſs, RAPHAEL's airs divine ?
Yet meads and lawns may ſtill deſerve thy care ;
The landſcapes of LORAIN were copy'd *there*.

Be thine the Art t'enrich the poor man's toil,
And cultivate the genius of the ſoil ;
To drive from hunger's boſom ev'ry groan,
And bleſs a little empire of thy own.
Thus He, [f] whoſe ſoul was long with glory fir'd,
Wiſely and *humbly* from the world retir'd :
Greatneſs and wealth had ſatisfy'd his view ;
He had a paſſion to be *happy* too :
Weary of grandeur, languiſhing for reſt,
Fatigu'd with pomp, and ſighing to be bleſt !
Long tho' he knew mankind, and long was known ;
In AGRAM's [g] vales he paſs'd his hours alone ;
One cultur'd grove ſupply'd the *Hercynian* wood :
His *pond*, a ſea ; his *rivulet*, a flood.——
Each hill and current bore poetic names,
Here tow'rd VESUVIO, and there roul'd a THAMES.
Around him yeomen's ſons as courtiers wait,
And VIRGIL's GEORGICS made the *Code of State*.

July 20, 1768. W. H.

[e] The deadly night-ſhade.
[f] Diocleſian.
[g] AGRAM, the capital of *Croatia*, ſituated on the banks of the *Savus*. [Formerly *Croatia* was a part of the old DALMATIA.]
Never was ſeen a more lovely tract of ground than the proſpect about *Agram*.

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A LIST

A LIST *of* WRITERS *upon whoſe* AUTHORITIES *the principal Paſſages in this Work are founded, being in Fact almoſt a general Collection of Books on Agriculture and Rural Oeconomics in all Languages, ancient and modern.*

VARRO de Re Ruſtica, 8vo. Steph. 1542.
Hartlib's Legacy, 4to. 3d Edit. 1655.
Tullii Orat. Ejuſd. Epiſt. Tuſc. Quæſt.
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——— Ego nec studium sine *divite vena*;
Nec *rude* quid prosit video ingenium.——
HORAT.

ESSAY

ESSAY I.

A

GENERAL INTRODUCTION;

SHEWING

That Agriculture is the Basis and Support of all flourishing Communities;—the antient and present State of that useful Art;—Agriculture, Manufactures, Trade, and Commerce justly harmonized;—of the right Cultivation of our Colonies;—together with the Defects, Omissions, and possible Improvements in ENGLISH Husbandry.

Εὖ μὲν γὰρ φερομένης ΤΗΣ ΓΕΩΡΓΙΑΣ ἔρρωνται αἱ ἄλλαι τέχναι ἅπασαι.

XENOPHONT. *Oeconom.* Κεφ. ΙΕ.

DIRECTIONS to the Book-binder.

ESSAY. I.

PLATE I. muſt front Page 102.
PLATE II. muſt front Page 143. *Ibid.*
PLATE III. to front Page 146. *Ibid.*

ESSAY II.

PLATE IV. to front Page 93.
PLATE V. muſt front Page 191. *Ibid.*

ESSAY I.

The great Importance of Agriculture, its Defects, Improvements, &c. &c.

WHEN I ſay that theſe eſſays on huſbandry are written in imitation of *Cowley*'s eſſays on ſubjects of a like nature, I am inclined to hope that the reader will allow me to have choſen a very pleaſing and inſtructive model.

One large part of the preſent work was originally nothing more than the ſubſtance of anſwers to ſeveral letters from curious gentlemen who requeſted the author to give them his advices and directions concerning the new foreign method of *tranſplanting* lucerne, and that as long ſince as the year 1757.

It is with ſome regret that we ſee works of this nature publiſhed annually in *France* and other countries, and diſperſed through *Europe* with high reputation, when it is well known that *England*, if its inhabitants would apply themſelves to carry on improvements in huſbandry, might exceed, and in all probability ever will exceed any other nation in the culture of land. So that what *Varro* ſaid of *Italy* in antient times, may be juſtly applied at preſent, and with undoubted pre-eminence, to this kingdom: Ecquam terram *cultiorem* vidiſtis?--*Nullam* arbitror eſſe, quæ TAM TOTA ſit CULTA. [e]

Yet ſtill there is room left for acquiring freſh knowledge in various branches of huſbandry: And of courſe it is much to be wiſhed, that ſome proper

A per-

[e] *De Re Ruſt.* l. i. c. 2.

perſon or perſons were appointed to execute amongſt us what *M. Du Hamel* and others carry on with ſuch uncommon ſucceſs in a neighbouring kingdom: [f] And that public premiums from the government, or provincial ſubſcriptions from individuals, might be allotted yearly to the beſt productions of grain, graſſes, *&c.* in ſuch manner as the ſeveral contributors and encouragers ſhall think fit to ſpecify.

As *England* is ſo juſtly celebrated for its knowledge and induſtry in the culture of land, there are great reaſons to hope that ſome public eſtabliſhment will be ſet on foot for the improvement of huſbandry, and then all writers of an inferior order, like myſelf, will, or at leaſt ought to be beſt contented with ſubmitting their few obſervations and experiments to the reviſal and correction of more experienced judges.

It is undoubtedly needleſs to urge how juſt a title agriculture has to claim the encouragement and protection of the ſtate.—The annual produce of the lands in *England*, only, is ſuppoſed to amount to twenty millions *ſterling*.—If huſbandry therefore could

[f] *Samuel Hartlib*, a celebrated writer on huſbandry in the laſt century, a gentleman much beloved and eſteemed by *Milton*, in his preface to the work, *commonly called his* LEGACY, *laments greatly that no public director of huſbandry* was eſtabliſhed in *England* BY AUTHORITY; and that we had not adopted the *Flemiſh* cuſtom of *letting farms upon improvement*. "If it pleaſes God" (ſays he) to bleſs theſe motions, and that, accordingly, the national huſbandry of this commonwealth be *improved*, we may hope, through God's bleſſing, to ſee better days, and be able to bear neceſſary and public burdens with more eaſe to ourſelves, and benefit to human ſociety, than hitherto we could attain to." PREF. p. 2. 4°. 1651. *Cromwell*, in conſequence of this admirable performance, allowed *Hartlib* a penſion of 100 *l.* a year; and *Hartlib* afterwards, the better to fulfil the intentions of his benefactor, procured Dr. *Beati*'s excellent annotations on the Legacy, with other valuable pieces from his numerous correſpondents.

could be improved but *one sixth* part more, (as upon the whole it certainly may [a]) what a glorious acquisition would this single circumstance introduce amongst us, [b] and that by multiplying industry and wealth without increase of luxury? *Maxime pius quæstus, & stabilissimus.* [c]

And here (if the reader can be induced to imagine that any thought is worth adopting from an old *German* author) I wish husbandry might be improved amongst us to such a degree, that, if *Julius Cæsar* or our own *Fitz-Herbert* [d] "could return to life and re-visit *England*, they might confess, when they lifted their eyes towards the heavens, they recollected the same stars in their old situations and relative distances, but, upon casting their eyes down to the ground, saw a soil cultivated in a new manner, and enriched with such a variety of vegetables to them unknown, that they would gladly be informed what might be the name of this new country?"

The astonishment of a person, upon such a supposed occasion, may serve to put one in mind of what occurred to *Achilles* when he waked, after his mother *Thetis* had conveyed him in his sleep from

[a] It has been asserted by an able writer, and I think proved, that *France*, with commonly good husbandry, might support many millions more of people than it maintains at present. *Police des grains à Berlin*, 12°. 1755. p. 12. The same, *mutatis mutandis*, may be applied to *England*.

[b] "The improving a kingdom, in matter of husbandry, is better than *conquering a new kingdom*." Hartlib's *Legacy*, p. 42. 3d edit. 4°. 1655.

[c] Cato *de Re Rust. in proëm.*

In urbe luxuries creatur: Ex luxuria existat avaritia necesse est: Ex avaritia erumpat audacia: Inde omnia scelera ac maleficia gignuntur. Vita autem hæc rustica, quam tu *agrestem* vocas, parsimoniæ, diligentiæ, justitiæ magistra est.

Tullii *Orat. pro Sext. Roscio.*

[d] *Anthony Fitz-Herbert*, judge of Common-pleas, the father of *English* husbandry in the reign of *Henry* VIII. See more concerning him in this Essay, and Essay II. *Sect.* 2.

his preceptor *Chiron*. Moſt readers of claſſical knowledge will recollect the paſſage.

Cum pueri tremefacta quies, oculiq; jacentis
Infuſum ſenſêre diem; ſtupet aëre primo.—
Quæ loca?—Qui fluctus?—Ubi Pelion?—Omnia verſat,
Atq; ignota videt; dubitatq; agnoſcere *matrem*.

"Which verſes," as *Dryden* ſays, (ſpeaking of another paſſage equally animated in the ſame author) "would coſt me a whole day to tranſlate;" and therefore I ſhall modeſtly leave them to ſome abler hand.

All obſerving men muſt have remarked that our land has ever paid its grateful acknowledgments to the ſtate, and the more its produce and profits are augmented by public encouragements and private generoſities, the more chearfully are its proprietors enabled to contribute their aſſiſtances towards the well-being and proſperity of the government.

Agrarian laws, well contrived and judiciouſly enforced, are the ſhining ornament of *codes* and *pandects*. Witneſs our own law concerning the exportation of grain, and the bounty annexed thereto.

It is certain that agriculture, beyond any other profeſſion of gain, confers the greateſt advantages on its own country; and thoſe who conſider it attentively through its ſeveral ſtages of operation, may compare it to the leaves of a tree which open, ſpread, grow verdant, die, and fall to the roots of the parent-trunk that produced them, where they turn to manure, and carry on re-production the enſuing year.

No one ever knew the advantages of huſbandry, or the inconveniences that ariſe from its diſcontinuance, better than our maſter *Virgil*: For inſtead

of describing all the dreadful consequences of war in every kind, nay even without mentioning fire, sword, plunder, and famine, he only says in a few words,

——— NON ULLUS ARATRO
DIGNUS HONOS; *squalent abductis arva colonis.*

And by that way, though the case may be different, yet the effects are equally hurtful in times of peace, if the art of agriculture be not justly encouraged and honoured.

To encourage this art therefore is to assist nature in her operations, for it is agriculture that determines the *physical* strength of any state: And is the stream that overflows the land with plenty and population, though the true source thereof may be unknown to us.

Quæ dat aquas, saxo latet hospita nympha sub imo.—

Simple and uncompounded in the beginning, it appears to contain no great matter that is interesting or striking; but on closer examination resembles those little elevations of earth which continue to rise imperceptibly, and at length close the farthermost point of view in the landscape with a range of Alps that seem to touch the skies.

Agreeably to this, it has been asserted by the best writers, antient and modern, that agriculture is the support of states: The basis of commerce and independency. [g] Nor could any thing make us forget

 these

[g] "In whatever age we find a country grosly ignorant of agriculture, we may be assured it must have been but thinly inhabited: And perhaps the swarms of people that issued from northern nations into southern climes were not so much a proof of po-

theſe truths, but becauſe they are common ones; mankind being naturally fond of novelty, and too apt to prefer the *ſhowy* to the *uſeful*, or overlook what is *near*, in order to ſpeculate upon that which is *diſtant*. Yet it is always beſt to prefer plain, obvious, and ſimple truths, as proving in the end moſt uſeful, as well as moſt univerſal. The wealth or indigence of a nation takes its deciſive turn, in proportion as the earth is well or ill cultivated. Vegetable nature receives aſſiſtances from the precautions and encouragement of a wiſe legiſlator; induſtry awakens at the call, and undertakes with chearfulneſs whatever is propoſed with reaſon, and patroniſed by the power of a prudent adminiſtration.

Since arts and ſciences have ariſen amongſt us to ſuch high perfection, mankind ſeems to apply itſelf more to the *productions* of *art* than *thoſe* of *nature*.[g] And hence it happens that the primitive ſource of wealth and the vital ſupport of no leſs than the whole human ſpecies are both conſigned to the management of very mean ignorant people. Nor is ſuch injudicious conduct ever once reflected upon except in times of *ſcarcity*; and then a return of plenty ſoon baniſhes every melancholy reflexion. We attempt for the moment to remedy preſent grievances, but leave thoſe very grievances, when they next occur, to take care of themſelves.

Husbandry affords the only true ſeminary of ſoldiers and mariners, for it inures men from their early youth to heats, cold, fatigues and labour: And

populouſneſs, as that an uncultivated country is eaſily over-ſtocked, and that at certain times it muſt neceſſarily be obliged to diſburden itſelf of uſeleſs mouths it could not ſupport"

Wallace's *Numbers of mankind.*

[g] Natura eſt ars Dei — Liber unus divinitate plenus, divinorum ſpeculum. *Marſil. Ficin.*

And is one main cauſe of health and ſtrength. [h]— The eſtabliſhment and propagation of all colonies is founded originally upon agriculture: And by the rules of agriculture the inhabitants cultivate the ground, and prove uſeful to the parent-hive from whence they migrated.—The produce of the huſbandman's labours is the only merchandize which all the world is *obliged to deal in.* Theſe and ſuch-like conſiderations induced *Cicero*, after long experience, to recommend the reading of *Cato*'s husbandry in a very ſtrong manner to his ſon *Marcus*; "of all the profitable arts," ſays he, "no one art is preferable to agriculture; nothing is more uſeful, nothing more worthy of a man in a ſtate of freedom." *Omnium rerum ex quibus aliquid exquiritur, nihil eſt agricultura melius, nihil uberius, nihil homine libero dignius.*

It has been computed that a piece of ground conſiſting of three ſquare miles, or nineteen hundred and twenty acres of commonly good land, will furniſh food for 870 perſons. Are we arrived, or not, to this degree of induſtry and populouſneſs?— Might not *England* maintain one 5th more of diligent ſubjects than it ſupports at preſent?—War, navigation, and commerce can never diſpeople a wiſe nation conſiderably, where agriculture flouriſhes in full vigour: For, as the waves of the ſea are always ready to overflow a country that is ſituated in ſuch a manner as to give them admittance, ſo wealth and population will enter into any kingdom that by human care is rendered qualified to receive and cheriſh them [i].

[h] Ex agricolis viri fortiſſimi & milites ſtrenuiſſimi gignuntur: Cato *de re Ruſt. in proëm.*—Miniméq; mali cogitantes.

PLIN. *Nat. Hiſt.* l. xviii. c. 5. Vid. Xenoph. Oeconom.

[i] "That government or policy is beſt, cæteris paribus, that can ſupply food to the greateſt number of people.—In every country

On the other hand, *depopulation* in a fertile country, or in land capable of being rendered fertile, is a ſure conſequence of *neglected* husbandry. Men naturally abound, when they have food enough; and live tolerably at their eaſe.—The *phyſical* evils abovementioned, as alſo thoſe of famine and epidemical diſtempers, ſoon repair themſelves; and *moral* evils (more to be dreaded, as they undermine the foundation and well-being of government) are to be rectified by the vigilance of the legiſlature. Governments are not rendered truly populous by the mere progreſs of propagation, but by the induſtry and labour of the inhabitants. Not to mention the enjoyment of all reaſonable liberty both in mind and fortune——The poor peaſant deſpairs of feeding his children, when he wants bread himſelf: Like the gardener who periſhing with thirſt can afford no water to nouriſh his plants.——Therefore whenever good lands, as in *Italy*, *Spain*, and ſuch-like countries are thinly inhabited, ſure it is, that husbandry and other uſeful arts of acquiring ſubſiſtence are neglected. Hence *Egypt* and *Paleſtine*, that once poured forth innumerable armies, are now a deſart: And *England* and *Holland* (ill-peopled in ancient ages according to *Cæſar*'s account) are at preſent become nurſeries of men.——Again, "in ſome countries, ſays *Monteſquieu*, that were once ſo famous for plenty, wealth, and population, we find no monuments thereof at preſent, except in antient geographers and hiſtorians." [k]

It is certain, that *Spain* wants five millions of its priſtine number of inhabitants, ſince ſhe neglected agriculture as alſo handy-craft labours of all ſorts, and

country there will always be found a greater number of inhabitants, cæteris paribus, in proportion to the plenty of proviſions it affords." *Numbers of Mankind*, pag. 14, 15.

[k] *Hiſt. de la Decadence de l'Empire Rom.* tom. I.

and poſſeſſed the wealth of *America*. So that *Spain*, though trebly larger than *England*, contains, at preſent, fewer inhabitants. Thus idleneſs, luxury, and migrations, will exalt a kingdom to imaginary wealth, and, at the ſame time, reduce it to actual poverty. Nay, if we conſider only the *latter* of theſe *three* aſſigned cauſes, namely, the peopling and garriſoning, *&c.* of new colonies, it will be found according to the beſt political calculations, that a country cannot *arm* or *ſend abroad* more than one man out of an *hundred* without running the riſque of greatly injuring its agriculture, commerce, manufactures, and population. [1] But the declenſion of *Spain*, or any other country circumſtanced like her, ſhall be conſidered more at large in another part of this Eſſay. And therefore it may ſuffice to obſerve for the preſent, that, though it is death in *Spain* to export money, yet the riches of the *Spaniard make wings for themſelves* and *take their flight* to other nations: So that *Spain* has a leſſer ſhare of her own money, than *France*, *England*, and *Holland* have of it. Neither laws nor penalties can confine treaſure, when food, raiment, and other common neceſſaries of life are wanted. In this ſenſe

Aurum

[1] Of this opinion is the writer laſt quoted. Experience has ſhewn perpetually, ſays he, that no *European* prince (in a trading country where agriculture is alſo encouraged) who has a million of ſubjects, can poſſibly, without deſtroying himſelf, keep and maintain above ten thouſand ſoldiers and ſea-men.—But the caſe was different antiently with regard to commonwealths: For this proportion between the ſoldiers and the reſt of the people, which is now as *one* to an *hundred*, might in thoſe times be pretty near as *one* is to *eight*." *Hiſt. de la Decadence*, &c. tom. I.

Partly for the ſame reaſons, the *Pruſſians* and *Auſtrians* at preſent may afford *thirty* ſoldiers to our *ten*, merely becauſe we are the more induſtrious nation, and can better employ our ſubjects.

Aurum per medios ire ſatellites,
Et perrumpere amat ſaxa potentius
Ictu fulmineo.

"Nature," ſays *Locke*, "has beſtowed mines on ſeveral parts of the world, but their riches are only for the *induſtrious* and *frugal*. Whomever elſe they *viſit*, it is with the *diligent* and *ſober* only they *ſtay*. And if the virtue and provident way of living of our anceſtors (content with our native conveniences of life, without the coſtly itch after the materials of pride and luxury from abroad) were brought into faſhion and countenance again amongſt us, this would do more to keep, and increaſe our wealth and enrich our land, than all our *paper-helps* about *intereſt*, *money*, *bullion*, &c. which, however eagerly we may catch at, will not, I fear, without better husbandry, keep us from ſinking, whatever contrivances we may have recourſe to. 'Tis with a kingdom as with a family, ſpending *leſs* than our own commodities will *pay for* is the ſure and only way of growing rich.——Till then, we in vain, I fear, endeavour with noiſe and weapons of law to drive the wolf from our own to one another's doors: The breed ought to be extirpated out of the iſland. For want, brought in by ill management, and nurſed up by expenſive vanity, will make the nation poor, and ſpare no-body." [m]

People are naturally increaſed by induſtry in huſbandry; and the ſelf-ſame induſtry falls by degrees into trade and commerce. Whatever elſe enriches a ſtate, is not a conſtant feeding ſtream,

(Tho' deep, yet clear, tho' gentle, yet not dull,
Strong without rage, without o'er-flowing full;)

but

[m] *Conſiderat. on lowering intereſt*, &c. p. 35. vol. II. fol.

but a momentary impetuous torrent, more destructive than fruitful.———It was a received opinion amongst the antients, that a large, busy, well-peopled village, situated in a country thoroughly cultivated, was a more magnificent sight than the palaces of noblemen and princes, in the midst of neglected lands. [n] It is of great use therefore to find full-employment for country-labourers and keep them at home. And so much the rather, as it may be observed in general, that almost every peasant who leaves his native abode or district, becomes afterwards an unprofitable member to society. The country is deprived of a labourer, and, if he finds himself obliged to return thither, he seldom gives his mind cordially to labour.—Therefore (says an observing foreigner) "the loss of a peasant, industrious in husbandry, who breeds up his family in the same occupation, is, though it be not perceived, of greater detriment to the community than the death of two or three well-dressed footmen."

Rome was ruined more by neglect of agriculture, and giving no attention to *useful* trade and commerce, than by the invasion of barbarians. Her soldiers could be but little depended on, when they had no home, no profession, (but that of plunder and devastation) with nothing to lose. On the other hand, whilst the cultivation of the earth was kept in full vigour, the people of *Israel* multiplied and flourished; but degenerated into sloth and luxury under a negligent prince, in many other respects renowned for wisdom.—Read all histories of all ages, and you will find industrious nations the most populous as well as the most virtuous.

In-

[n] Fundi propter culturam jucundiores sunt multis quam regiè polita ædificia aliorum: Cum hujus spectatûm veniant villas, non (ut apud Lucullum) ut videant pinacothecas, sed operothecas. *M. Varro de Re Rust.* l. i. c. 2. p. 47.

Induſtry is the *vis motrix* of huſbandry; and therefore an antient *Engliſh* writer obſerves, "that a ſingle uncultivated acre is a real phyſical evil in any ſtate." But, if men will extend this principle, then the breaking up and bringing into culture large portions of ground, formerly waſte and neglected, will be an acquiſition of value to every ſtate; for ſuch tracts of ground properly managed (even upon ſuppoſition they can never be made equal to the beſt ſoils) will afford additional employment and ſubſiſtence to a conſiderable number of people.

It is certain, from ſacred writings, that the people of *Iſrael* manifeſted no great uneaſineſs concerning ſcarcity or famine. Though they were ſhut up within narrow bounds, (nor was the country aſſigned them famous for fertility) yet no nation upon earth, occupying the ſame extent of ground, was more populous; for agriculture was held by them in high eſteem, and carried to all the perfection they could give it; beſides which, their ſupreme Legiſlator had promiſed them abundant harveſts as natural rewards of their induſtry and obedience. °

Such are the effects of induſtrious diligence: And a nation thus employed may be compared to a piece of

° *If ye will hearken to his judgments, and keep them, I will love thee, and bleſs thee, and multiply thee; he will bleſs the fruit of thy land, thy corn, and thy wine, and thine oil, the increaſe of thy kine, and the flocks of thy ſheep, in the land which he ſware unto thy fathers to give thee. Thou ſhalt be bleſſed above all people: There ſhall not be a male or female barren among you, or among your cattle.* DEUT. c. vii. ℣. 12, 13, 14.

The Lord thy God bringeth thee into a good land, a land of brooks of water, of fountains, and depths that ſpring out of vallies and hills; a land of wheat and barley, and fig-trees, and pomegranates, a land of oil and honey; wherein thou ſhalt eat bread without ſcarceneſs. Ibid. c. viii. ℣. 7, 8, 9.

If you hearken diligently to my commandments, I will give you the rain in due ſeaſon, the firſt rain, and the latter rain, that thou mayeſt gather in thy corn, and thy wine, and thine oil. I will ſend graſs in thy fields for thy cattle. Ibid. ℣. 13—15.

of tapiſtry-work, where a certain texture of threads and an union of colours, imperceptibly interwoven and blended together, repreſent agriculture, trade, commerce, and the mechanic arts. In mixing and harmonizing theſe conſiſts the great ſkill of the workman: And, except due care be taken in this point, the richeſt materials will be weak, unpleaſing, and uſeleſs.—Therefore though trade, commercial arts, and huſbandry ſhould be all encouraged and ſupported in wiſe governments with ſcrupulous attention, yet ſtill the ſcale may be allowed to preponderate in favour of agriculture: But *that* in ſo ſlight a degree as only to be perceived by a few perſons of moſt diſcerning judgment; for the people employed in manufactures, artizanſhip, *&c.* are ſtarved in times unproſperous to their buſineſs, if they are not ſupplied with the common neceſſaries of life by the generous induſtry of the cultivator; nay, even in more proſperous times care muſt be taken to ſupply our fellow-citizens with food convenient, and *that* food at a moderate price, for fear of being under-ſold in the works of our labour by other nations.

But with us, ſays *Columella*, ſpeaking of the *Romans*, (though the remark will hold good by way of expoſtulation with the preſent age) "*all trades and occupations of life are taught young people, excepting agriculture.* [P]. And hence it happens, that as *opinion*

[P] Atqui ego ſatis mirari non poſſum, quod qui ædificare velint fabros & architectos advocent; qui navigia mari concredere, gubernandi peritos; qui bella moliri, armorum & militiæ gnaros—Sola res ruſtica, quæ ſine dubitatione proxima, & quaſi conſanguinea ſapientiæ eſt, tam diſcentibus egeat quam magiſtris. —— Agricolationis doctores qui ſe profiterentur, neque diſcipulos cognovi.—At ſine agricultoribus nec conſiſtere mortales, nec ali poſſe, manifeſtum eſt. Quo magis prodigii ſimile eſt, quod accidit, ut res corporibus noſtris, vitæque utilitati maxime conveniens, minimam uſque in hoc tempus conſummationem haberet, idque

opinion and *cuſtom* are the two *ſovereigns* of the *world*, and as our anceſtors neglected to cultivate their lands in perſon, or eſtabliſh ſufficient laws for the encouragement of huſbandry, we, their deſcendants, adopt the ſame ideas and conduct without heſitation. Hence the art is little thought of, or eſteemed in general; for our parents, not poſitively, but indirectly, infuſed into us a diſtaſte for it, and the government has not thought fit, in ſome inſtances at leaſt, to awaken the huſbandman's attention by a proper number of rewards and inducements.

All ſtates owe more to agriculture than any other profeſſion of life. Thus, for example, it will be found upon a near examination that grain of every kind, fleſh-meat, wine, beer, oil, (and, in ſhort, whatever the merchant and huſbandman vend either at home, or abroad:)—The timber, cordage, ſail-cloth and proviſions, uſed in navigation; vegetables, alimentary or medicinal, as likewiſe fruits; fewel, wax, tallow, honey, hops, ſaffron, and the productions of the dairy, with an infinite number of *etcæteras*, all proceed originally from the cultivating hand or watchful care of the poor peaſant.—It is much the ſame in regard to the manufacturer, who in general exerciſes his induſtry upon the productions of the cultivator, or the creatures bred up and ſupported by him.—Thus *art* ſtands indebted to the husbandman and peaſant for the materials ſhe works upon; and that almoſt from the higheſt to the loweſt inſtance; wherefore upon the whole the main buſineſs of every well-regulated government is to take care that the ſource which ſupplies all theſe aſſiſtances may be rendered as copious and permanent as poſſible: And that it may always increaſe

idque ſperneretur genus amplificandi, retinendique patrimonii, quod omni crimine caret.

De Re Ruſt. in *proëm.*

creaſe in proportion to the induſtry, trade, and populouſneſs of any nation. [q]

Yet theſe are not the only aſſiſtances and advantages which agriculture affords to various induſtrious members of ſociety in their ſeveral trades and employments. The exporter or merchant cannot hope for great demands and quick returns, except he can furniſh foreign markets at a moderate rate; and, as the manufacturer muſt gain a livelihood and other profits which are to be conſidered as the juſt reſult of his labour, one may venture to aſſert that the *price of goods* is principally founded upon *that of proviſions*. Which ſingle circumſtance may be looked upon as an inconteſtable proof that trade and commerce depend on the good cultivation of the earth: And, of courſe, whoever encourages the *latter* may be looked upon as the patron and promoter of the *former*.

It is therefore a prime *arcanum* of government to maintain agriculture in full vigour and proſperity, care being taken that grounds reputedly uſeleſs may be rendered uſeful by cultivating ſomething properly adapted, and congenial as it were to the nature of the ſoil: (Which by the way was the grand ſecret of *Flemiſh* huſbandry ſo much admired by our anceſtors in the beginning and middle of the laſt century.) To which may be added the draining of fens and moraſſes; incloſing commons; cleanſing waſte tracts of land from heath, briars, ſhrubs, and furze; diligent ſearch for coals, minerals, &c. public and private encouragements for planting timber-trees; and, above all, the bringing wild native plants and graſſes into culture and uſe, [r] and the in-

[q] Gabriel Platte's *Diſcovery of infinite treaſure*, 4°. 1656. Pref.

[r] *Hartlib* ſays, "we have in *England*, growing wild, 23 ſorts of trefoil, one of the wholeſomeſt, beſt-taſted vegetables that cattle

introduction of foreign ones for the better and more abundant ſupport of cattle. For it is not ſufficient that lands ſhould be cultivated; it is neceſſary likewiſe, that, they ſhould be well, properly, and vigorouſly cultivated.

Hence the true genius of animating agriculture muſt reſide in him, or thoſe, that hold the reins of government in any flouriſhing ſtate or kingdom; as alſo in the nobility and gentry of all denominations; nor ſhould rewards be wanting, nor public premiums, nor marks of favour. For agriculture, in a word, as it is the moſt uſeful, ſo it appears to have been the firſt employment of man. And, indeed, it is a noble occupation to employ uſefully the gifts which God has depoſited for us in the hands of nature, and beſtow them, when perfected by our induſtry, for the ſupport of human kind.

Sacred ſcripture beautifully repreſents a king in this character, namely, *Uzziah* [b]; — *Homer*, conformably to the ſimplicity and virtue of antient ages, repreſents a king ſtanding amongſt the reapers and giving them directions by pointing with his ſceptre. [c] — *Ovid* has deſcribed a prince with great juſtice, who

cattle can feed on: And yet only two ſorts are admitted into huſbandry."

I will not diſpute but that thoſe two ſorts are well ſelected; but many of the *other* kinds will proſper, where *theſe* will not.

Dr. *Merret*, in his Pinax, enumerates 26 known ſorts of trefoils, which are natives of *England* and *Wales*. And many more might ſtill be diſcovered, if we gave our attention to find out new kinds of wholeſome food for grazing animals.

[b] 2 *Chron.* c. xxvi. v. 10. *Hate not huſbandry which the moſt High hath created.* Eccles. vii. v. 15. *The profit of the earth is for all, the king himſelf is ſerved by the field.* Ibid v. v. 9.

[c] Ἐν δ' ἐτίθει τέμενος Βαθυλήϊον· ἔνθα δ' ἔριθοι
Ἤμων, ὀξείας δρεπάνας ἐν χερσὶν ἔχοντες.
——Βασιλεὺς δ' ἐν τοῖσι σιωπῇ
Σκῆπτρον ἔχων ἑστήκει ἐπ' ὄγμου γηθόσυνος κῆρ.

Iliad. Σ. 550.

who encourages religion and cultivates the arts of peace:

Quæritur interea quis tantæ pondera molis
Sustineat, tantoque queat succedere regi.
Destinat imperio clarum prænuntia veri
Fama Numam.——
———Animo majora capaci
Concipit: & quæ sit rerum natura, requirit.—
Conjuge qui felix *Nympha*, [r] *ducibusque Camœnis*
Sacrificos docuit ritus, gentemque *feroci*
Assuetam *bello*, *pacis traduxit ad artes*.——
Metam. l. xv.

Under this head I will give the picture of a prince who makes it his study to encourage religion and agriculture at the same time. It is a sketch drawn by a poet of our own country:

Our isle, indeed, too fruitful was before:
But all uncultivated lay
Out of the solar walk, and heaven's high-way;
With rank *Geneva*-weeds run o'er,
And cockle, at the best, amidst the corn it bore.
The royal husbandman appear'd,
And plough'd, and sow'd, and till'd:
The thorns he rooted out, the rubbish clear'd,
And bless'd th' obedient field.
When straight a double harvest rose,
Such as the swarthy *Indian* mows;
Or happier climates near the line,
Or paradise manur'd, and dress'd by hands divine.
DRYDEN.

Diocletian, according to the account left us by *Ælius Spartianus*, found more true greatness and so-

[r] *Egeria.*

lid happineſs in his little villa to which he retired, than ever he had enjoyed, even on the imperial throne; and when a friend once perſuaded him to re-aſſume his greatneſs, "Ah, proconſul," ſaid he, "if you could but ſtay a month with me, and ſee how my fields and garden thrive and proſper, you would never talk and judge ſo remotely from the truth of things as you do at preſent!" and *Conſtantine* IV. abridged the *Geoponic writers* himſelf, [p] or at leaſt cauſed an abridgment of them to be publiſhed, and, perhaps, reviſed it.

Xenophon, in his *book of œconomics*, beſtows due encomiums on a *Perſian* king, who examined, with his own eyes, the ſtate of agriculture throughout his dominions, and in all ſuch excurſions (according as occaſion required) bountifully rewarded the induſtrious, and ſeverely diſcountenanced the ſlothful. In another place he obſerves, that, when *Cyrus* diſtributed premiums with his own hand to diligent cultivators, it was his cuſtom to ſay, "My friends, I have a like title with yourſelves to the ſame honours and remuneration from the public; I give you no more than I have deſerved in my own perſon; having made the ſelf-ſame attempts with equal diligence and ſucceſs." [q]

Xenophon, in another part of the ſame treatiſe, informs us, that when *Lyſander* brought preſents to *Cyrus* from the ſtates of *Greece* that were in confederacy with him, the prince received him with all imaginary courteſy and humanity, and, amongſt other things, ſhewed him his gardens, which were called the *paradiſe of Sardis*. The ambaſſador, who was

[p] *Greek* writers on huſbandry. In the next ESSAY we ſhall ſpeak more concerning them and their works; parts of which are ſtill extant: To which will be added ſome account of the emperor *Conſtantine* IV.

[q] *Oeconom.* c. 4. ſect. 16, *&c.*

was equally charmed with the plan and execution of the whole, expreſſed himſelf in raptures concerning the *man* who had ſhewn ſuch genius in the deſign, as well as ſkill in the cultivating part. *Cyrus*, having obſerved him with ſome pleaſure, ſpoke to this effect: "You ſee in me," ſaid he, "the perſon who conceived, diſpoſed, and adjuſted all this; I can even ſhew you a conſiderable number of trees that were planted with my own hands; for, whenever I find an interval from public buſineſs, it is my cuſtom to labour till the ſweat comes upon my brows." *Lyſander*, amazed with this declaration, ſurveyed the prince again, and ſeeing him dreſſed not only with propriety, but ſplendor, and having already been witneſs to his politeneſs and elegance of manners, "O king," cried he, "you are truly fortunate, in poſſeſſing ſo fine a genius, and employing it in ſo uſeful a manner!" [s]

Our author concludes this narration with remarking, that a truly great prince ought to hold the arts of war and agriculture in the higheſt eſteem; for by ſuch means he will be enabled to cultivate his territories effectually, and protect them when cultivated.

Such was the character *Xenophon* gave of one of the moſt amiable and proſperous princes that ever adorned the pagan world. There are modern princes who may equal *Cyrus* in his military capacity, but are totally ignorant or regardleſs of matters of agriculture.

But nothing affects the heart more pleaſingly and naturally than the account which *Homer* gives us of old king *Laertes*, [t] who, though diveſted of wealth, power, and grandeur, retired into the country and lived happy on a little farm, purchaſed, in all probability,

[s] *Oeconomic.* c. 4. ſect. 20—25.
[t] *Odyſſey*, l. xxiv.

bability, with money gained by his labour and induſtry. "The good man's fields," ſays the poet, "were in excellent culture, and *Ulyſſes* found him hard at work, digging round the roots of a plant, and expecting his ſervants from the woods with thorns to form a quick-ſet fence."

Plutarch, who, in this reſpect, ſeems to have wanted a taſte for true ſimplicity, conſiders the whole paſſage relating to *Laertes*, as mean and degrading: But *Cicero* refers to it with approbation; for in his *Cato major*, ſpeaking of the innocent amuſements of old-age, he illuſtrates his aſſertions by this very example: *Homerus Laertem deſiderium lenientem, quod capiebat e filio, colentem agrum & ſtercorantem facit.* And, by the way, the Menedemus of *Terence* is the very copy of *Laertes* in *Homer*: A ſtrong inſtance that *Terence*, who could be no ill judge of a well-drawn character, thought *Homer*'s an exact repreſentation of human nature, and the applauſe with which that comedy was received, ſhews that all *Rome* was of the ſame opinion.

Having thus proved on the one hand, that agriculture, in the opinion of the wiſer antients, is an occupation and amuſement not unbecoming the higheſt claſs of men; it may be obſerved, on the other hand, that it carries with it many more advantages in all well regulated governments than have been hitherto ſpoken of.—"If we are deſirous therefore" (ſays a ſenſible author upon this occaſion) "that a tree" (by which he means the common-wealth) "ſhould be enabled to furniſh good fruit, we muſt not limit our attention to the mere cultivation of its branches, namely, trade, commerce, manufactures, *&c.* but, on the contrary, ought always to perſevere in improving the ſoil, and nurſing the roots that collect the nouriſhment;" by which he makes an alluſion to the encouragement of

of agriculture: "For on *that* depends the combined ſtrength and vigour of the allegorical tree we are now deſcribing." [a]

Mr. *Wallace*, in his ingenious diſſertation before referred to, is of the ſame ſentiments with *M. du Hamel*; and as I think it not the leſs unfair, for being common, to adopt another writer's notions for one's own, I ſhall tranſcribe, once for all, five or ſix ſhort ſimilar remarks on the preſent topic, which may corroborate what ſhall afterwards be advanced, and ſerve to vindicate me from being thought to maintain any novel opinions upon this ſubject.

"Operoſe manufactures of linen, wool, and ſilk, toys and curioſities of wood, metals, or earth, elegant furniture, paintings, ſtatues, *&c.* and all the refinements of an opulent trading nation, tend to multiply men's wants, make the moſt neceſſary and ſubſtantial things dearer, and, in general, increaſe the expences of living. [b]——In proportion as taſte increaſes, men's wants increaſe. [c]——Where manufactures abound, perhaps five [d] acres will only keep

[a] DU HAMEL; *Culture des Terres.* Tom. V. *en prof.* p. 2. This beautiful alluſion ſeems to be borrowed from Lord *Verulam:* Si arborem ſolito fructuoſiorem fieri cupias, de ramis medicandis fruſtra cogitaveris: Terra ipſa circa radicem ſubigenda, & gleba lætior admovenda, aut nihil egeris.

De Augment. Scient. l. ii. p. 61. fol.

[b] *Numbers of Mankind*, p. 23.

[c] Ibid. p. 30.

[d] *Five* acres, *per* head, appear in my judgment too many, even where manufactures flouriſh greatly. The *Romans*, in their calculations and aſſignments of land, allowed only a *couple of acres* to each perſon, but that allowance was over-ſcanty, their acre being ſomewhat ſmaller than ours. But, upon the whole, regard muſt always be had to the perfection that agriculture is arrived at in any country.

Nor will this aſſignment of five (or rather *four*) acres, *per* head, any ways claſh with my calculation in a ſubſequent part of this eſſay, becauſe Mr. *Wallace* ſpeaks of land at an average

as

keep a man; where the taſte is more ſimple, much leſs may ſuffice.[e]——The ancients had no advantage over the moderns; trade was more confined, and agriculture more encouraged.[f]—The diſcovery of the two *Indies* have increaſed depopulation.[g]—Laſtly, to *import* elegant manufactures, in the room of elegant ones *exported*, is doing nothing."[h]

In conſequence of theſe remarks, we ſhall obſerve, that manufactures, trade, and commerce, (by which we mean the true commerce of the antient *Tyrians* and *Phœnicians*, *that of œconomy)* and alſo the mechanic arts in general, render every ſtate wealthy and flouriſhing; but agriculture is the true foundation of all.[i]—It is *that* alone which *feeds* a nation,

as it runs, *cultivated*, or *uncultivated*. For if the good land be tolerably well managed, and if we ſpeak of *bread only*, one acre of wheat will ſupply two perſons during the whole year.

[e] *Numbers of mankind*, p. 25.

[f] Ibid. p. 96.

[g] Idem, ibid.

[h] Ibid. p. 26.

[i] "Whilſt agriculture continues in good health," ſays *Xenophon*, "every other art grows ſtrong and flouriſhing." *Oeconom.* ch. xv. and in another place, ſpeaking on the ſame ſubject, ſays, "*that* art is moſt worthy to be approved of by all wiſe men, which brings the greateſt convenience and profit to the ſtate."

"Agriculture is one of the nobleſt and moſt neceſſary parts of induſtry belonging to a common wealth: The firſt ground of mutual trading between men and the well-ſpring of wealth in all well-ordered ſocieties."

HARTLIB's *Epiſtle Dedicatory*, prefixed to Sir *Richard Weſton*'s *diſcourſe on the huſbandry of* Brabant *and* Flanders, 4°. 1655. p. 4, 5.

SAMUEL HARTLIB, a *German* gentleman by birth, was the great promoter of huſbandry during the times of the commonwealth, and much eſteemed by all ingenious men in thoſe days. *Milton* addreſſed to him his *Treatiſe on Education*, and Sir *W. Petty* inſcribed *two letters to him on the ſame ſubject*. Lond. 4°. 1647, 1648.—Of his penſion from *Cromwell*, on account of his advancing the art of agriculture, we have already ſpoken.

About

nation, and makes it populous. And, though the *former* ought generally to be looked upon as *efficacious means* that tend to the enrichment of any ſtate or kingdom, yet theſe very means derive their *original efficacy* from the ſupplies and aſſiſtances of the *latter*; which, like a large river, carries wealth and

About the time when this author flouriſhed ſeems to be an æra, when *Engliſh* huſbandry roſe to high perfection; for the preceding wars had made the country gentry poor, and, in conſequence thereof, induſtrious; tho' ſometimes the reverſe of this happens in many kingdoms. But theſe wiſe men found the cultivation of their own lands to be the very beſt poſt they could be fixed in. Yet, in a few years, when the reſtoration took place, all this induſtry and knowledge were turned into diſſipation and heedleſſneſs; and then huſbandry paſſed almoſt intirely into the hands of farmers.

The famous work attributed to *Hartlib*, and called the LEGACY, was only drawn up at *Hartlib*'s requeſt, and, paſſing thro' his correction and reviſion, was publiſhed by him; it conſiſts of one general anſwer to the following query, namely, *what are the actual defects and omiſſions, as alſo the poſſible improvements in* Engliſh *huſbandry?*

The real author of this work was R. CHILD. To it are annexed various correſpondences from perſons eminent for ſkill in agriculture at that time; as *C. D. B. W. R. H. T. Underhill. Henry Cruttenden, W. Potter, &c.* as alſo the *Mercurius Lætificans*, and 20 large experiments by *G. Plattes:* Together with annotations on the legacy by Dr. *Arnold Beati*, and replies to the animadverſions by the author of the *Legacy*.

Hartlib writ a little treatiſe *on Setting Land*, which is much eſteemed; and ſome attribute to him *Adam*'s *Art revived*, tho' that work ſeems to belong more properly to Sir *H. Platt*.

He alſo publiſhed Sir *R. Weſton*'s famous diſcourſe of *Flemiſh* huſbandry, without even knowing the author's name at the time of the firſt publication; and afterwards, in order to enlarge and better explain it, annexed Dr. *Beati*'s annotations to it. This is all I know concerning his (*Hartlib*'s) performances in agriculture. He writ, beſides, *a true and ready way to learn the* Latin *tongue*, 4°. 1654. *A vindication of Mr.* John Durie, 4°. 1650, 3 ſheets; and publiſhed *Twiſſe*'s *doubting conſcience reſolved*, 8vo. 1652.

Blythe tells us, that *Hartlib* lodged and maintained *Speed* in his houſe, whilſt he compoſed his book of improvements on huſbandry. *Improver improved*, p. 177.

plenty along with it, embelliſhing its borders, vallies, and a wide tract of country round it, with lively verdure and delightful landſcapes; all which derive their richneſs and beauty from a ſingle ſpring, which, by degrees, forms itſelf into an immenſe river, being fed and increaſed with numberleſs little currents and rivulets.

At the ſame time that theſe remarks are made by me, I have induſtriouſly avoided the taking notice of numberleſs paſſages which the antients have left us in regard to the happineſs of a life paſſed in agriculture, as may be ſeen particularly in the writings of *Homer*, *Heſiod*, *Xenophon*, *Cato*, *Cicero*, *Virgil*, *Pliny* the elder, *Columella*, and others, who writ ſincerely from their heart in better ages. Agriculture is now the drudgery of the loweſt part of mankind, and not the amuſement of the brighteſt and moſt elegant genius's. Theſe beautiful ſcenes of fairy-land appeared only in the earlier ages of rural ſimplicity : For the country *now* has adopted, from the higher world, its proportionable ſhare of frauds, circumventions, over-reaching and artifices. For theſe reaſons, we ſhall repreſent huſbandry, at preſent, to be juſt *ſuch* as it really is : Or, in other words, as being little more than matter of public and private *utility*.

Utility, therefore, being in our days the main object of human purſuits in agriculture, it is with juſtice, that the ancients called the earth our *common parent :* For *ſhe* not only feeds the tradeſmen, manufacturer, and artizan, but affords them materials to exerciſe their induſtry upon : By the exchange or ſale of which men find reſources wherewith to ſupply the ſecond collateral neceſſaries of life; and, perhaps, it may be worth remembering, *that one million's worth of things vendible, being productions from our earth, and raiſed by our own hands at home, will, when*

exported, bring a nation more real gain than the ſale of three millions worth of goods in manufactures, provided the materials manufactured are purchaſed from abroad.

From hence, as well as many other parts of the preſent work, it appears, that the fruits or vegetable productions of the earth are the *true real fundamental riches* of any country. All that *art* can add to *nature* eſtabliſhes only a ſort of wealth by *mutual convention* or compact, ſubject to viciſſitudes of time and the caprices of cuſtom. Agriculture alone can ſtand its ground amidſt theſe revolutions: For the cultivations of the earth muſt always be attended to. Nay, ſo active is this firſt principle of human ſubſiſtence, that, if it be depreſſed in one country, it muſt naturally riſe in another. When it ſubſides in part, the ſtate will feel ſome ſenſible diſorder; but, if it ſinks intirely, the government will gradually ſink with it. This made a great and obſerving genius ſay, almoſt two centuries ago, "that wheat, and other uſeful grains, like the flux and reflux of the ocean, will force their way in ſome place or other: If you check them in *Europe*, they may break forth in *Tartary*, or the *Weſt-Indies*." [b]

A ſenſible *French* writer has luckily hit upon the ſame original notion; "agriculture, deſtroyed by various cauſes, traverſes the earth, flying from place to place, where it is oppreſſed, and taking up its reſt where it is permitted to breathe freely. It reigns, at preſent, where nothing was formerly to be ſeen but deſarts; and where it once reigned, there are now only deſarts." [c]

In every ſort of work where man is concerned, and particularly in agriculture, which is the main occupation of man, the expences muſt be deducted before we calculate the profit. This is a plain ſimple truth, eſtabliſhed upon common ſenſe: And the

[b] *MS.* Note of *Gabriel Plattes* upon *Googe*'s *Huſbandry*.
[c] *Hiſtoire de la Decadence*, &c. Tom. I.

the neglect of attending to it has proved detrimental to many nations, which, being flattered with the ſhewy appearances of things, have preferred riches acquired by the tradeſman and artizan, (points highly valuable beyond all contradiction) to riches procured from the productions of the earth, our common parent, which ſupplies materials to the tradeſman and artizan, either mediately or immediately: ——And, that no offence may be given on this ſubject, an example ſhall be taken from our neighbours the *French*. [ε]

The manufacturers of *Lyons*, *&c.* ſend abroad (more or leſs) every year, as many different ſorts of workmanſhip in ſilk, as ſell for 15 millions of livres; and *Paris* ſupplies foreign countries in goldſmith's work, jewelry, clocks, watches, gold and ſilver lace, embroideries, and a multitude of toys and trifles, commonly called *clinquallerie*, to the amount of 10 millions of livres annually; yet ſtill the previous out-goings ought firſt to be deducted; for great part of the raw ſilk is bought from other nations; the gold and ſilver likewiſe are imported, upon which the artiſt ſhews his ſkill: And the ſtipend of workmen makes a conſiderable abatement. Nay, what is ſtill more, theſe very people, thus employed, however dexterous they may be in their way, yet are of a genius abſolutely limited, ſo that, upon a ceſſation of buſineſs in their proper department, they are unable to turn their hands towards carrying on the general and neceſſary labours of ſociety, in order to procure ſubſiſtence for themſelves or others. Of courſe, when their reſpective occupation ſtops, or is ſtopped, they muſt either remove themſelves elſewhere (perhaps into other countries) or ſuffer extreme poverty at home. Which ſhort compariſon alone is ſufficient to ſhow that there is

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[ε] *Memoire du Marq. de Mirebeau pour concourir au Prix*, &c. p. 254.

ſome little ſuperiority on the ſide of agriculture in the long-run, and upon the whole.

Indeed, it may be retorted, that the conſumption of proviſions, occaſioned by manufactures, advances the price of the huſbandman's commodities; [1] agreed:——But at the ſame time it augments the price of labour, raiment, and almoſt every common neceſſary of life. All, therefore, we contend for is, that the two occupations may be *juſtly harmonized*, but that the ſcale may preponderate *a little* in favour of huſbandry; leſt, by any accident, ſome branch of trade may be checked or ſtopped;—for proviſion muſt be found for our fellow-ſubjects, and that juſtly, when they are willing to work, but cannot find employment; nevertheleſs, in governments rightly managed, there is no need of a competition or parallel between trade and huſbandry, for in all caſes they mutually aid and aſſiſt each other.

It is the ſame in the ſeveral branches of agriculture, compared with themſelves: They reciprocally ſtrengthen one another. Thus for example (to give one principal inſtance out of many) paſturage ſupports the cattle which are abſolutely neceſſary for the cultivation of corn, and affords rich manures to carry on its vegetation with proſperity.—And again, the ſupreme inſtitutor of huſbandry has arranged things in ſuch a manner, that no one principal branch ſhould interfere with another in point of time. The preparation of the earth for receiving ſpring-corn, or graſſes, is completed early in the year; then comes on the ſeaſon of making hay; next ſucceeds an interval for ſummer-fallowing, as alſo for horſe-hoeing and (in ſome countries) cleanſing

[1] "Though the value of labour will become higher, as manufacturers increaſe, it will not compenſate the greater expence of living. For this is only *one* article, and will not enable the lower and greater part of mankind to furniſh themſelves with ſuch variety as growing manufactures render ſeemingly neceſſary, and difficult to be purchaſed." *Numbers of mankind.*

ſing the vineyard; afterwards all hands ſeem to be at leiſure for carrying on the great work of harveſt; which is cloſed by the vintage; then the ſowing of wheat takes place, as alſo the ſeaſon for winter-fallowing, felling of wood, repairing fences, carrying out, and ſpreading manures, *&c.* The whole is cloſed by a ſort of pauſe and remiſſion from labour, as winter is the time for a general preparation, in order to renew our labours with ſucceſs and vigour the enſuing ſpring.

But to return from this ſhort digreſſion.

How far ſoever men may languiſh for the acquiſition of great wealth too ſuddenly, certain it is, that gold, ſilver, diamonds, *&c.* drawn out of the mine, neither can, nor ever will enrich a country like the profits made by trade and agriculture; both which every wiſe legiſlature ſhould cautiouſly guard and take care of as the eyes and heart of the political body, always remembering that each of them has a child's ſhare in the affection and eſteem of their foſter-parent, who is to diſcover no undue partiality to one or the other, any farther than that agriculture ought to be conſidered as the *elder-born*. *Colbert* half ruined huſbandry in *France*, by making an attempt to *diſinherit* agriculture, and *adopt* trade; whereas, in truth, he ought to have encouraged both, and cauſed them to have flouriſhed at the ſame time, with all poſſible luſtre. And here Mr. *Locke*'s advice deſerves to be written in the ſtateſman's memorandum-book, with letters of gold; "he that would make the lighter ſcale preponderate to the oppoſite, will not ſo ſoon do it by adding increaſe of new weight to the emptier, as if he took out of the heavier what he adds to the lighter; for then half ſo much will do it. [h]

Upon the whole, it is never beſt for a country to acquire wealth too expeditiouſly. Riches, *thus* obtained, are like acquiſitions made, not by patient

[h] *Conſiderations on lowering intereſt*, p. 7.

pro-

progreſſive induſtry, but by gaming or lotteries.—A weak mind is ſoon over-ſet with an inundation of wealth. So that, perhaps, it might be better for ſociety, if ſometimes over-grown fortunes (either in trade or otherwiſe) were not acquired too ſuddenly: For then there would be more equality, and leſs corruption of manners. [z]

It is highly prudent to place all the important truths above-mentioned in the beſt lights we are able; for ſome addreſs and much delicacy are required in handling a ſubject of ſo nice a nature: Eſpecially if one is conſcious of diſſenting ever ſo little from the commonly received notions of mankind. In *ſuch a caſe*, it may be ſaid with *Livy*, *Invitus, quaſi vulnera, attingo.*

In addition, therefore, to what has been obſerved incidentally, though agriculture may bring leſs gold into a kingdom than trade and commerce do, yet it produces not only money (as in caſes of exportation, *&c.*) but money's worth, or ſomething more valuable to a nation than money; as, for example, food, increaſe of ſubjects, and many other bleſſings and advantages.—Of courſe, an induſtrious well-peopled nation (if the alternative is to be choſen) had better be without large ſums of wealth, than ſuffer a diminution in its populouſneſs; which latter muſt happen, when proviſions, raiſed by agriculture, are rendered dear, or trade feels any conſiderable

[z] Scripture warns againſt aiming to get rich too ſoon, or too compendiouſly: for great poſſeſſions thus ſuddenly acquired, throw men naturally into thoughtleſſneſs and luxury.—*When the Lord hath given thee houſes full of good things, which thou filledſt not; and wells digged, where thou diggedſt not; vineyards and olive-trees, which thou plantedſt not;—when thou ſhalt have eaten and be full, then* BEWARE *leſt thou forget the Lord which brought thee forth out of the land of Egypt, from the houſe of bondage.* Deut. vi. 10, 11 12. And again *According to* THEIR PASTURE, *ſo were* THEY FILLED; *they were filled, and their heart was exalted;* THEREFORE *have they* FORGOTTEN ME. Hosea xiii. *v.* 6.

able check or reduction. It is true, a large quantity of money, or abundance of paper-credit in a country, carry with them a dazzling appearance, but the concluſion drawn from thence may chance ſometimes to prove equivocal: Nor are they a real proof of ſolid permanent national wealth or ſtrength, except agriculture joins its true concurrence: *That* being the only profeſſion, which, if rightly managed, is ſubject to no change or variation, except for a moment. *Much increaſe* of riches and inhabitants, ſays *Solomon*, *is in the ſtrength of the ox*, [1] or, in others words, the proſperity of huſbandry. From whence it follows, that a wiſe people would ſooner be maſters of the mountainous fields in the canton of *Berne*, than of the palace and treaſury of *Dehlia*. —And, at the ſame time, it has been obſerved, pertinently enough, by the great writers of antiquity, when they have been conſidering public œconomics, that cities may be rendered unprofitably populous, when they drain the country of its due number of inhabitants, be the trade or commerce of a nation as great as may be imagined.

To explain the matter ſtill farther, *one hundred pounds* gained by a farmer, including the work of ſervants, day-labourers, women, and children employed by him, brings more benefit to the community, *than three hundred, or twice three hundred pounds* acquired by the work of a ſingle artiſt, occupied in matters of mere ſuperfluity and ornament: Tho' the *latter* has the appearance of being a more induſtrious and uſeful member. The *former* affords employment in part, or in the whole, to near 20 people, but the *artiſt*, circumſtanced as above, calls in the aſſiſtance of no one.—All ſuch ſudden wealth, gained from the luxury and folly of others, is a meteor rather than a ſun: It darts a momentary blaze, but has neither duration nor that kindly warmth which

[1] *Prov.* xiv. *v.* 4.

which feeds and enlivens nature.——Therefore, without talking figuratively, rich luxurious immoral ſtates finiſh their career of glory like the *Rhine*, which ſhrinks into a rivulet before it loſes itſelf in the ocean.

Of courſe, *that* profit which maintains moſt people, is of the greateſt advantage to any government; but when the earth is cultivated to its full extent, and we have ſtill a ſufficient number of men for uſeful trades, commerce, and manufactures, as alſo for the ſupply of our navy, armies, *&c.* then the arts of ornament and elegance may take place, yet *ſtill with moderation.* [c]

It is a point inconteſtable, that the firſt occupation of mankind, according to ſcripture, was *that* of agriculture.

As far backward as profane hiſtory can afford us any light, the wiſe and ſober heathens directed the employment of their lives by the patriarchal example and model, paſſing their days in ſimplicity and induſtry. The prince, the rich man, and the peaſant, with a ſmall difference of more and leſs,

[c] "If there are more people in any ſtate than the lands can ſupport with the beſt culture, then trade alone can make them flouriſh."—"Induſtry, trade, and commerce may enrich and people a country where agriculture is neglected, but then the food muſt be brought from abroad."——"The fine arts ought never to take place in a country, till the earth be cultivated to the utmoſt."

Numbers of mankind, p. 22, 25.

"Indeed, if it can ever be proved, that a few artizans, *&c.* can produce more by the vent of their labours, and upon eaſier terms, than a larger number of men employed in agriculture, then a particular nation may *gain* in wealth, but *loſe* in population."

Idem, p. 22.

The effect of commerce is wealth, ſuddenly acquired; the conſequence of ſuch wealth luxury, and that of luxury the perfection of the elegant arts.

MONTESQUIEU.

leſs, purſued the ſame end by the ſame means. But now, as an ingenious and ſenſible author laments, [d] a conſiderable number of the great and opulent not only abandon their fellow-creatures in the country, but conſider them almoſt as inferior beings of another ſpecies: As *hewers of wood and drawers of water*; whom they partly neglect and partly deſpiſe; when, at the ſame time, they feaſt upon the animals that theſe poor laborious people have nouriſhed, riot in wines that their ruſtic hands have preſſed, and ſleep at eaſe upon *that very down* which came firſt from ſome *miſerable cottage*.

To ſuch of the great and opulent as are here deſcribed (tho' ſtill there are reaſons to hope that the number of them is not large) it is no ways our intention to addreſs the following eſſays, but apply ourſelves rather to the ſenſible, reflecting, and compaſſionate, who poſſeſs large tracts of land, and have many huſbandmen and labouring peaſants dependant on them. [e]—Theſe great and good perſons cannot help recollecting that they owe not only their bread, but the delicacies of their table; the delicious flavour of their wines, fruits, and garden-vegetables; the raiment that cloaths and adorns them; the fire that warms them; the tapers that yield them light; the ſoftneſs of their ſleep; the magnificence of the equipage that draws them; and a part of the medicines that gives them eaſe:—That they owe them, I ſay, to the care, induſtry, perpetual labours and attention of their poor neglected fellow-creatures, who want almoſt every comfortable bleſſing which they ſupply abundantly to their ſuperiors. For the main,

[d] *Du Hamel*; *Cult. des Terres.* Tom. VI. *Pref.* p. 1, *&c.*

[e] Apud majores noſtros ſummi viri, clariſſimique homines qui omni tempore ad gubernacula reipublicæ ſedere debebant, in agris quoque colendis aliquantùm operæ temporiſque contempſerunt.

Tullii Orat. pro Roſcio Amerino.

main, that these careful pains-taking drudges require, is coarse cloathing enough to keep them warm, and humble food sufficient to pacify the demands of hunger; and thus (in many countries at least, or, in other words, in every part of *Europe* but *England)* they rarely taste of that wheat which their hands have sown, or the flesh of the cattle which they have bred up and nourished with so much care and anxiety. *Blessed is he who shall consider such poor and needy* industrious contributors to the ease and well-being of those who are more fortunate and opulent; *the Lord shall deliver him in the time of trouble!*

Asking pardon for this short apostrophe, which appears not to be void of reason and humanity, it must still be remembered, in order to pursue the subject we are undertaking, that whenever nations become *populous*, and food grows *dear* and *scarce*, it is *then expedient to attempt discovering some new improvements in husbandry*; [a] which *Arcana* the supreme Father of all seems to have reserved in store, in order to reward the industry and diligent searches of his faithful children, and supply those wants and demands which naturally present themselves, when nations *are rendered populous, merely by being virtuous, laborious, and frugal.*

Mankind, at first, lived chiefly upon the spontaneous productions of the earth, freely reached out to them by the bounteous hand of nature. [b] But,

[a] "As *people* increase, let *invention* increase; and thus by *industry food* may be *multiplied.*——Even as twenty hives of bees, being all industrious, do live as well as if there were but one hive in the same garden."

Gabriel Plattes's discovery of infinite treasure, 4°. p. 23, 1638.

[b] The picture of this progressive life is partly copied from *Varro.*—Gradum fuisse naturalem, cum homines viverent ex iis rebus quæ inviolata ultro ferret terra. Ex hac vita in secundam

when ſocieties began to grow more numerous than ſuch ſupplies of food could well maintain, recourſe was had to the ſpade, and induſtry employed it well in order to augment the quantity of ſuſtenance which the earth was able to produce. Mankind ſtill multiplying, and freſh demands increaſing, the plough was called in, as an happy ſuccedaneum; but when the whole together could not ſuffice, and nature at length grew languid and exhauſted under continual efforts, the huſbandman allowed his lands a *fallowing*, and the advantages of reſt and repoſe were thought of, in order to recruit and enrich the ſoil. From whence it follows, that new diſcoveries ought ſtill to be attempted, in proportion as the want of proviſions increaſes in any flouriſhing country. For it avails little to find a nation populous, if you have not food ſufficient to ſupport the community upon eaſy terms. Plauſible theories, upon this occaſion, are little more than ingenious amuſements; a ſeries of well-made experiments can alone eſtabliſh matters of fact. For, though a dextrous artiſt may give ſhrewd gueſſes by the help of a correct *eye*, yet, in works of moment and difficulty, he ſhould always have recourſe to his *rule*.

Therefore what we want chiefly in huſbandry, is a *ſeries of experiments, judiciouſly made, and faithfully related.*

"Reaſon hath deceived me ſo many times," ſays that excellent writer on agriculture, *Gabriel Plattes*,

dam deſcendiſſe paſtoritiam, cum propter utilitatem ex animalibus, quæ poſſent ſylveſtria, deprehenderent, ac concluderent & manſueſcerent. In queis primum non ſine cauſa putant oves aſſumptas & propter utilitatem & propter placiditatem. Tertio denique gradu a vita paſtorali ad agriculturam deſcenderunt; in qua, ex duobus gradibus ſuperioribus retinuerunt multa, & quo deſcenderunt ibi proceſſerunt longe, dum ad nos perveniret.

De Re Ruſt. l. ii. c. 1. p. 74. a. 74. b.

Plattes, [c] "that I will truſt reaſon no more, unleſs the point in queſtion be confirmed, and made manifeſt by experience :—Without *which*, no knowledge in huſbandry is perfect; for experience admitteth no impoſture. [d]

This is a very frank and honeſt declaration, and the author, in order to prove his ſincerity on the occaſion, compoſed a treatiſe, intitled, *Art's Miſtreſs, containing his own experiments for fifty years*; but it was never publiſhed, ſo far as can be learned at preſent; which may be attributed to the hurry and confuſion of the civil wars, or to that general inattention and careleſſneſs which took place at the reſtoration.

About the ſame period, an *uncle and a nephew* collected another ſeries of *huſbandry-obſervations and experiments for ſeventy-four years ſucceſſively*; but there are ſome reaſons to fear, that the laſt-named *MS.* has either periſhed, or ſlept in the ſame obſcurity with the foregoing one. Not but that there may be copies of each *MS.* ſtill extant; and, if ſuch be the caſe, it is much to be hoped that the poſſeſſors of them

[c] This author may be conſidered as an original genius in huſbandry. By the known times of his life and death, it is pretty certain, that he began his obſervations in the latter end of queen *Eliſabeth*'s reign, and continued them through the reigns of *James* and *Charles* I, as alſo during three or four years of the common-wealth. See more concerning him, ESSAY II.

[d] Etenim experimentorum longe major eſt ſubtilitas quam ſenſûs ipſius.—Itaque eò rem deducimus ut ſenſus tantum de experimento, experimentum de re judicet.

Franciſci de Verulum Inſtaur. Magn.

The ſame author, in order to excite a ſpirit of improvement, gives the following conſolation to all ſuch as are of an enterprizing genius:

Nemo animo concidat, aut quaſi confundatur, ſi experimenta quibus incumbit, expectationi ſuæ non reſpondeant. Etenim quod ſuccedit magis complacet: Et quod non ſuccedit, ſæpenumero non minus informat.

De Augment. Scient. l. v. c. 2.

will cauſe them to be publiſhed, which may be ventured upon with little riſque; for experimental writings (ſuppoſing the experiment to be fairly and honeſtly made) will bear publication in any age; ſince time, faſhion, and language can never affect truth and matter of fact; and what is new and inſtructive, will always carry its own weight with it; *opinionum commenta delet dies, naturæ judicia confirmat.*

But to reſume the point we were before conſidering. If men will not be wanting in their inquiries, ſearches, and diligent endeavours, there are reaſons to think that God will inſpire them with means to feed and maintain a number of inhabitants and uſeful animals one third greater than what we have at preſent; [e] of which lucerne affords a proof no ways contemptible, in regard to cattle; whereas, on the other hand, huſbandry, as it is negligently or ignorantly practiſed in ſome parts of this and other kingdoms, will be found in many ſuch places to diminiſh the quantities of food and value of eſtates, rather than increaſe them.—Here certainly is full room for improvement.

It is therefore that *Solomon* recommends induſtry with ſo much vehemence to all thoſe that cultivate the earth: [f] For, ſays an ingenious author (whilſt he is conſidering the paſſages alluded to in the notes, *God ſeldom rains manna upon the ſlothful, or feeds them miraculouſly.* [g] And by the way, according to the all-wiſe appointment of Providence, it is the ſame with

[e] Rerum natura ſacra ſua non ſimul tradit: Initiatos nos credimus; in veſtibulo ejus hæremus. Illa arcana non promiſcuè omnibus patent: Reducta & interiore ſacrario clauſa ſunt.
SENECÆ *Quæſtion. Natural.* l. vii. c. 31.

[f] *Prov.* chap. xiii. ℣. 2. c. xv. ℣. 19. c. xxii. ℣. 5. c. xxiv. ℣. 31.

[g] Platte's *practical Huſbandry improved*, 4°, 1656.

with the *human mind*, as it is with the *earth*; for education and good agriculture make the like improvements upon either. [i] The wild herd derives a savage nature from the soil round it. The man born in ignorant countries is uncivilized and unenlightened. Transplantation into more kindly ground improves a plant, [k] and unwearied culture increases those improvements. Thus, likewise, it is with *man*.—Instructions exalt the powers of a docile mind, and industry, in teacher and learner, supplies the place of diligent cultivation in husbandry. [l]

Another circumstance of a different nature ought to be mentioned, which is, that we recommend upon the present occasion, *a more correct and accurate sort of agriculture* than what is commonly made use of. Our intentions in so doing are two-fold. (1.) Tho' the out-goings are something more considerable than in the ordinary course of husbandry, yet the returns sufficiently counterbalance the expences, and that by one third at least, in clear profit; besides which, the tenant and proprietor will soon find the advantages of cultivating lands in this manner. The *former*, for a reason already assigned: The *latter*, for another reason equally obvious, which is, that the income of his estate will not *sink* at a new *taking*; for lands, cleared from weeds, and brought by diligence into good heart, may be long

[i] "Natural abilities need pruning, *&c.* like natural plants."
Bacon's *Essays*, vol. III. fol. p. 371.

[k] Exuerint sylvestrem animum, cultuque frequenti
In quascunque voces artes haud tarda sequentur.
Necnon et sterilis, quæ stirpibus exit ab imis,
Hoc faciet, vacuos si sit digestaper agros.
Virg. *Georg.* II. ℣. 51.

[l] Nam ut ager quamvis fertilis sine cultura fructuosus esse non potest, sic sine doctrina animus.
Ciceronis *Tusculan.* 2.

continued in the ſame condition upon cheap and eaſy terms —(2.) The repeated induſtry and diligence, neceſſary to be uſed in *this peculiar ſort of huſbandry*, will afford increaſe of employment to labouring-men, and alſo to women and children, who could otherwiſe gain next to nothing. In proof of which, a tract of land, planted with vines, lucerne, *&c.* will employ and maintain more country people, than doubly, or, perhaps, trebly the ſame quantity of ground ſown with corn. Nor can there be any reaſon for diſcouraging or diſcontinuing theſe minute advantageous labours till a kingdom is found (upon ſome other accounts) to abate in its populouſneſs. Hence it is that all inventions which perform the work of twenty people, with one pair of hands, are, upon the whole, detrimental rather than uſeful, in a well-peopled country, except you can have ſure and quick vent for what commodities you *thus* produce: Whilſt on the contrary, (at leaſt in the preſent inſtance) the culture of *new* plants for huſbandry-uſes (or, in other words, for the better ſupport of cattle) tranſplantings, horſe and hand hoeings, weeding, digging, ſetting, drilling, breaking up, and meliorating barren lands (or, to ſpeak more properly, *lands reputed to be barren:*) draining, peat-cuttings, making compoſt dunghils, *&c.* ought all to be encouraged; as the owners gain much money by ſuch undertakings, and employ more work-people at the ſame time. [m] To which we ſhall only ſubjoin one general remark, namely, that *in any country where there is full conſumption at home, or commerce for exportation, the beſt uſe*

[m] "Thoſe machines which are deſigned to abridge art, are not always uſeful. If a piece of workmanſhip is of a moderate price, ſuch as is equally agreeable to the maker and the buyer, thoſe machines which would render the manufactory more ſimple, or, in other words, diminiſh the number of workmen, would be pernicious."

Eſprit des Loix, Tom. II. l. xxiii. c. 15.

use the land can be put to, is to cultivate THAT *crop, whatever it be, which produces the greatest profit* VALUED IN MONEY.

Thus I have known an acre of carroways equal in profit (all expences balanced) to five acres of wheat. And thus buck-wheat in *Germany*, and rye in *France*, make as good, and sometimes better returns than fields of pure wheat.—So that, in a very honest sense of rural œconomics,

——*Lucri bonus est odor ex re*
Qualibet.——

I shall now only add, by way of concluding this former part of the present essay, that, let the advocates of *new husbandry* argue as long as they please against the use of manures, [n] yet one prime intention, in the method of culture, which we here recommend, is to multiply manures in quantity, as well as enhance their qualities, since all those who have cultivated the earth in all ages, have looked upon *them* as the solid foundation of good agriculture. Hence it was that we have turned our thoughts more particularly to the cultivation and improvements of grasses, whether natural or artificial; [o] since the multiplication of cattle will help to produce a multiplication of manures or dressings; and thus the productions of the earth are both cherished and augmented.—At the same time, the in-

 crease

[n] See this point considered more at large in the last *Section* of ESSAY II.

[o] "It is a misfortune," says *Hartlib*, "that pasture lands are not more improved. *England* abounds in pasturage more than any other country, and is therefore richer. In *France*, acre for acre, the land is not comparable to ours: And therefore *Fortescue*, chancellor to *Henry* VI, observes, that we get more in *England* by standing still, (alluding to our meadows) than the *French* do by working; (that is, cultivating their vineyards and corn-lands." *Legacy*.

And

creaſe of cattle increaſes the quantity of food for man.—Cattle not only enrich, but aſſiſt us alſo in various inſtances: For the ſoil is chiefly prepared for huſbandry-uſes by the ſtrength of their labours—they are multiplied with eaſe, and require leſs care and attention than the culture of plants. Their inſtinct (in conjunction with the vigilance of their keeper) protects them from numberleſs accidents. They ſearch their food and drink without a guide, and return at evening in like manner. They live longeſt in *that* way of life which approaches moſt to a ſtate of nature.—The ſuggeſtions of nature ſupply them with more ſalutary medicines than their maſters can give them.—They are more lively, and in better temper, when permitted to feed without doors, provided they are ſupplied with a ſufficient quantity of wholeſome food. For the ſake, therefore, of this *ſecond* principal branch in rural œconomics, it were to be wiſhed, that all lovers of agriculture would endeavour to introduce, amongſt us, *new ſorts of vegetable food for cattle*, in order to ſupport them more plentifully, and conſequently augment their numbers: And in like manner we ſhould attempt to diſcover the moſt effectual method of deſtroying *weeds*, which are the defrauders and poiſoners of all graſs-fields. Nor ought we to neglect making experiments on *compoſt-dunghils*, the cheapeſt and moſt univerſal in their effects, of all manures: It being eaſy to collect them in the moſt ſolitary deſolate places where men have not the power of purchaſing ſuch dreſſings as are to be procured in the neighbourhood of rich populous towns. Of courſe, no reaſonable perſon will oppoſe the free uſe of them; for the conſtituent materials are almoſt

And a judicious experienced writer, in our own times, obſerves, "that no part of huſbandry is ſo much neglected in *England*, as the true culture of graſſes." *Millar.*

moſt as eaſily procured, and lie as much at common command, as air or water:

Quid prohibetis aquas? Uſus communis aquarum eſt.

It may be obſerved, further, that compoſt dunghils coſt little more than the labour of collecting *what* is mere matter of nuſance in our fields and court-yards. And here, indeed, it may, be worth obſerving, in what manner the ſupreme Being produces great and ſtrange effects from cauſes ſeemingly mean and without value: Since many of the things, intended by him to fertiliſe the earth, are little leſs than an offence and incumbrance to us, if not removed from our houſes, and the places near our houſes. Thus the huſbandman converts filth and dirt into wealth, more eaſily and effectually than any chymiſt. And, indeed, who could imagine that a new-mown field of graſs, or a plantation of ſtrawberries, owed their fragrance and ſweet taſte to the hearth and chimney; to ſinks and gutters; and the very riddance of ſtables and pig-ſties? We will now proceed to the ſecond part of this eſſay.

From the multitude of books publiſhed on the ſubject of cultivating the earth, one would have imagined the *art* to have been more ſtudied than it really has been; ſince upon the whole *it* continued in a ſort of declining condition from the days of *Virgil* and *Columella* till the time of *Conſtantine* IV, and then lay in a kind of dormant ſtate till about the middle of *Henry* VIIIth's reign, when it was rather *revived* than *improved*.

Indeed, about that time, judge *Fitz-Herbert*, in *England* (better known amongſt us, as author of another excellent work, called *Natura Brevium*) *Tatti*, *Stefano*, *Agoſtino Gallo*, *Sanſovino*, *Lauro*, *Tarello*, *&c.* in *Italy*, publiſhed ſeveral conſiderable books

books in agriculture ; but our countryman was the firſt, if we except *Creſcenzio dell' Agricoltura* (whoſe fine performance was printed at *Florence* in 1478) and *Pier Marino*, the tranſlator of *Palladius de Re Ruſtica*, who made his work public in the year 1528.

In the ſame century appeared *Matthioli*'s commentary on *Dioſcorides*, [p] as alſo a tranſlation of *Theophraſtus on Plants*, by *Biondo* ; and another of *Columella*, by an unknown hand.

Such of theſe *Italian* writers on husbandry, as did not concern themſelves with tranſlations, made the antients of their country their text and model, and are looked upon to be excellent in language, and no ways defective in experience and knowledge. On the former of which accounts, I have ſometimes known collections of theſe authors works made in *Italy*, not for the ſake of acquiring knowledge in husbandry, but merely on account of reading the pure *Tuſcan* ſtyle. Mean while, *Fitz-Herbert* ſhone, [q] with equal luſtre of truth, though not of lan-

[p] This noble work was firſt publiſhed in *Italian*, and five impreſſions were ſold off in a few years : But the exquiſite beauty of the *prints, cut on wood*, has made the copies extremely ſcarce. The *Roman* edition, in 2 vol. folio, 1569, is a very fine one ; yet, in ſome reſpects, muſt give place to the *Valdgriſi* edition at *Venice*, ten years before. The drawings of the plants were made by *Giorgio Liberali*, an ingenious young painter ; but, who the engraver or cutter was, I never could learn diſtinctly at *Rome* or *Venice*. Common fame mentions one *Theodoſio Richeli*.

[q] See more of this author in the notes to the next Essay, Sect. II.

Fitz-Herbert's books of agriculture ſoon raiſed a ſpirit of emulation in his countrymen. I have ſeen a liſt of ſeveral *Engliſh* writers on huſbandry, who were ſome of them his cotemporaries, but have never been able to procure a ſight of their works, nor obtain any material intelligence concerning the authors. For the ſake of the curious, I ſhall give a tranſcript of their names, as it was minuted down, in queen *Eliſabeth*'s reign, by that famous huſbandman, *Barnaby Googe*, Eſq;

Sir

language: For the *Italian* tongue was then in its meridian of glory, and the *Engliſh* had declined from the days of *Chaucer*, rather than advanced. Yet our countryman kept the field without a rival.

At length, in queen *Eliſabeth*'s reign, ſeveral husbandry-writers copied *Fitz-Herbert*; *Maſcal*, *Markham*, and others, in the times of *James* and *Charles* I, compiled from all; yet none had the gratitude to mention or acknowledge their firſt inſtructor, ° So that (if we except only the occaſional writers

Sir *Nicholas Malbee*,
John Somer (canon of *Windſor*)
William Lambert [I am ſince informed, that he writ *on the management and diſeaſes of cattle*.]
Henry Brockhull,
H. King, *D. D*,
Henry Denys,
John Hatche,
Nicholas Yeerzwort (query if not *Nicaſius Yetſwort*, whom *Anthony Wood* mentions as a writer on huſbandry,
Captain *Bingham*,
Thomas Wetteuhall,
Richard Deering,
M. Franklyn,
Richard Andrews,
William Pratt,
Philip Partridge,
Henry Datforth.

N. B. From this liſt it appears, that the *Engliſh* contributed as much towards the revival of agriculture, as the *Italians*; and (tranſlations from the ancients excepted) began as early. The *Flemings* and *French* made no figure till about a century afterwards.

° One writer particularly, not long after the reſtoration, tranſcribed the larger part of both *Fitz-Herbert*'s books, almoſt verbatim, without ſo much as informing the reader, or making the leaſt apology for this freedom, but calling his *Plagiariſm* the *Epitome of Huſbandry*, 12° 1699. He ſigns himſelf *S. B.* [*Samuel Balgrave*; or, as others ſay, *Billingſly*.] This tranſcript (now valuable by accident, as *Fitz-Herbert*'s books are very ſcarce) reaches to the end of page 181, and the remaining chapters are taken with the ſame liberty from *Maſcal*, *Blythe*, and an *Italian* author, who writ a treatiſe, called, by the tranſlator, *the Heroic Excellence of Horſemanſhip*.———Indeed, the copying of *Engliſh* writers on huſbandry, one from another, has been ſo ſervile and notorious, that there is hardly a miſtake in the antient authors laſt mentioned, as alſo in *Googe*, *Plattes*, *&c.* which is not faithfully preſerved in modern works upon the ſame ſub-

ters on *Engliſh* huſbandry at *that* period, agreeably to what we have mentioned in the preceding note) we had little or nothing that reſembled a ſyſtematical body of agriculture, but *Fitz-Herbert*'s two books for the ſpace of one hundred years; and then ſome new and great lights broke in upon us from the admirable writings and diſcoveries of *Barnaby Googe*, Lord *Bacon*, Sir *Hugh Platt*, *Gabriel Plattes*, Sir *Richard Weſton*, *Hartlib*, *Robert Child*, Dr. *Arnold Beati*, *Evelyn*, and ſeveral others.

France, about the year 1600 (and not ſooner) made conſiderable efforts in reviving husbandry, as appears from ſuch large works as *les Moyens de devenir Riche*, and the *Coſmopolite*, by *Bernard de Paliſſy*[u]; *le Theatre d' Agriculture*, by *de Serres*; *l' Agriculture & Maiſon Ruſtique*, by *Meſſ. Etienne & Liebault*, &c. &c.

The *Flemings*, about the ſame period, dealt more in the practice of husbandry, than in publiſhing books upon the ſubjects: So that queſtionleſs their intention was to carry on a private lucrative trade without inſtructing their neighbours; and hence it happened, that whoever wanted to copy their agriculture, was obliged to travel into their country, and make his own remarks; as *Plattes*, *Hartlib*, and Sir *R. Weſton* actually did. Their principal, and, one may add, their very juſt idea of husbandry conſiſting in *this*, namely, to make a farm reſemble a garden as nearly as poſſible. Such an excellent principle, at firſt ſetting out, led them of courſe to undertake the culture of *ſmall* eſtates *only*, which they

ſubject; which will appear to every candid reader upon examination.

One may ſay, of *Fitz-Herbert*'s huſbandry, what Sir *P. Sidney* applied to *Chaucer*'s poetry: *I marvel how in thoſe miſty times he could ſee ſo clearly, and how others, in ſuch clear times, could go ſo blindly after him.*

[u] A poor potter, in the reign of *Henry* IV. of *France*.

they kept free from weeds, continually turning the ground, and manuring it plentifully and judiciously.

Having thus brought the soil to a just degree of cleanliness, health, and sweetness, they ventured chiefly upon the culture of the more delicate grasses, as the surest means of acquiring wealth in husbandry, upon a small state, without the expence of keeping many draught horses or servants.

After a few years experience, they soon found that *ten* acres of the best vegetables for feeding cattle, properly cultivated, would maintain a larger stock of grasing animals, than *forty* acres of common farm-grass. And the vegetables they chiefly cultivated for this purpose were lucerne, sainfoin, trefoils of most denominations, sweet fenugreek, buck and cow wheat, field turnips, and spurrey, by them called *Marian-grasse*.

The *political* secret of their husbandry was, as we have observed before, *the letting farms on improvement*.

Add to this, they discovered eight or ten new sorts of manures. They were the first, among the moderns, who *ploughed in* living crops for the sake of fertilising the earth, and confined their sheep, at night, in large sheds built on purpose, [r] whose floor was covered with sand, or virgin earth, *&c.* which the shepherd carted away every morning to the *compost-dunghil*. Such was the chief mystery of the *Flemish* husbandry.

Of

[r] It appears, from *Shakespear*, that sheep, in his time, were thus housed at night by the *English* farmers:

> The turfy mountains, where live nibbling sheep;
> And flat meads *thatch'd* with *stover*, them to *keep*: i. e.
>
> *Shelter at night under cover*. *Stover* is wheaten straw, a Provincial Word, *Tempest*, act 4.

Of living *Engliſh* authors, on matters of husbandry, nothing needs be ſaid in this preface, ſince we ſhall teſtify our juſt eſteem for them in many parts of the following eſſays; and, of thoſe that have died within our memory, it may ſuffice to mention *Tull*, who, though an enthuſiaſt in his way, gave great proofs of an extraordinary original genius. It is true, fancy and judgment, matter of fact and ſpeculation, make their appearance alternately throughout his work; yet he had fund ſufficient to hazard much, and leave plentiful remains for poſterity. Hence the *du Hamels* [d] and *de Chateauvieuxs* ** have derived their knowledge; improving ſome things, altering ſome, and expunging others: So that at preſent, from *their* example, all the civilized nations in *Europe* are atttempting to light their torches from an *Engliſh* taper. *Tull*, therefore, upon the whole, ſeems to be the perſon, according to *Varro*, *cui noſtra ætas defert rerum Ruſticarum omnium palmam.*

For this and other reaſons, it may be ſaid, perhaps, without laying ourſelves open to the imputation of inſular vanity, [g] that foreigners, upon the whole,

[d] ** Theſe two foreigners may be conſidered as a couple of diſciples bred up and formed in the *Engliſh* ſchool of *Tull*. Like their maſter, they are both good ſcholars, and men of parts. *M. du Hamel*, in particular, enjoys ſeveral collateral advantages which *Tull* wanted, as the aſſiſtance of ingenious friends, perſons of rank and ſtation; and, above all, the countenance and patronage of his royal maſter; ſo that, perhaps, it may be aſſerted, without flattery, that this gentleman, and the marquis *de Tourbilly*, with regard to improvements in agriculture, have conferred a greater acquiſition of valuable ground upon *France*, than any of her generals of the late war.

Concerning *M. de Chateauvieux*, who ſeems to inherit a great ſhare of *Tull*'s *inventive* genius, ſee a note in the next eſſay.

[g] A writer, valuable for his antiquity and great inſight into human nature, deſcribes inſular prejudices in a very ſhort maſterly manner. The words are ſpoken by *Minerva* to *Ulyſſes*, when

whole, have allowed the *Engliſh*, with one voice, to be the firſt nation of *Europe* in regard to huſbandry: And, indeed, few, or no countries, in every reſpect, can boaſt ſuch large tracts of lands, ſo well cultivated, as ours. It remains only, that we always endeavour to keep to the ſame height of pre-eminence, in the culture of lands, that we poſſeſs at preſent; that we watch the proceedings of our *neighbours* with a jealous eye; taking care, at the ſame time, that they never gain an advanced march upon us. "For it is a right attention" (ſay foreigners) "to agriculture, which gave riſe to the greatneſs, riches, and power of *England*." [t]

Indeed it is obſerved in the ſame treatiſe I am now referring to, "that *England*, about the year 1621, was obliged to draw great part of its wheat from *France*, but recovered herſelf from that lethargy at the reſtoration"; which remark may be true in the firſt inſtance, but is not ſet forth fully and clearly in the ſecond inſtance, any further than what relates to the law promulged in favour of the exportation of corn. We will therefore give a ſketch of the whole affair upon a larger ſcale; the real hiſtory of the caſe being as follows:

Judge *Fitz-Herbert*, as has been obſerved elſewhere, revived the agriculture of the antient *Romans*

when he landed at *Pheacia* [now *Corfù*.] The expreſſions are ſtrongly marked, and I ſhall leave them to work their way in the language of the original:

Ἀλλ' ἴθι σίγῃ ———
Μηδέ τιν' ἀνθρώπων περιλέσσεο· μηδ' ἐρέεινε·
Οὐ γὰρ ξείνους δίδε μάλ' ἀνθρώπους ἀνέχονται,
Οὐδ' ἀγαπαζόμενοι φιλέες' ὅς κ' ἄλλοθεν ἔλθοι,
Νηυσὶ θοῇσιν τύγε πεποιθότες ———.

ΟΔΥΣΣ. Η.

[t] *Diſſertation Prelim.* aux Memoires Oeconomiques de la Suiſſe. A Zurich, 1760.

mans in our country, and gave the firſt (or, at leaſt, one of the firſt) original works of that kind to *Europe*, for the *Italians*, in general, began by tranſlations from *Columella*, *Palladius*, *&c.* and the *Geoponic* authors. At the end of queen *Eliſabeth*'s reign, *Fitz-Herbert*'s writings, by ſome unknown fatal concurrence of accidents, fell into a ſort of obſcurity. They were even forgotten, except by a few choſen genius's who made great, but unſucceſsful attempts during the reign of *James* I. [g] (agriculture and rural œconomics not being held in much eſteem, either by that prince, or his miniſters: If we except the endeavours made towards eſtabliſhing a ſilk-manufactory) and, when the patron of every uſeful and elegant art ſucceeded him, the morning of his reign gave the promiſe of a calm, clear, glorious day: But the noon of it was turbulent and ſtormy, and the evening cloſed with tempeſts and devaſtation.

Our fatal domeſtic wars changed the inſtruments of huſbandry into martial weapons; but, after the death of *Charles* I, artful avaricious men crept into the confiſcated eſtates of the nobility, gentry, and clergy; and as many of theſe new incroachers had riſen from the plough (or ſome low condition of life nearly allied to it) they returned with pleaſure to their old profeſſion, being chiefly animated by the love of gain. *Hartlib*, *Plattes*, *Blythe*, and others, ſeized

[g] During a part of the reign of *Eliſabeth* and *James* I, *France* exceeded *England* in the management of country-affairs, called by the antients, *œconomics*: [Which, perhaps, was owing to the writings of *Des Serres* and *De Paliſſy*:] For *France*, at that time, allowed a free exportation of corn. *Colbert* hurt agriculture by encouraging manufactures too much, and prohibiting the out-going of corn, under pretence of better ſubſiſting his manufactures; but *Sully* had taken the other method, and had nobler, as well as juſter views. *Memoire du Marq. de Mirabeau adreſſé à la Societé de Berne, en* 1760. p. 271, 272, *&c.*

ed this favourable disposition of the common people, and encouraged it by writings which have not since been equalled; nor was *Cromwell* wanting to lend his assistance.

But a total change of things, as well as the very cast and manner of thinking, joined with universal dissipation, and a false aversion to what had been the object and care of mean despised persons, soon brought the culture of the earth into disrepute with the nobility and gentry; which single circumstance, at any time, will throw a damp upon agriculture: For the farmer loves to be encouraged, animated, and rewarded by his superiors.——It is true, the ministry, after the restoration, did all that was in their power to stimulate and sharpen the husbandman's attention, which ought to be related, with pleasure, to their lasting honour. Perhaps, some of them had struck upon the idea, by reflecting on the bad management they had observed in *France* and *Spain*, whilst they attended *Charles* II. in his exile.

England formerly suffered periodical scarcity and famine, almost as frequently as her neighbours. *Exportation of wheat* was first allowed about the year 1661, under several restrictions; one of which particularly was, that no wheat should be permitted to be sent abroad, except it sold at home below the price of twenty-four shillings a quarter.

[b] The advantages of such permission were soon perceived: For wheat, in three years, increased to such a degree in its culture, as to sink one third in price; so industrious were men to raise what they had free and prompt vent for. Pleased with such promising beginnings, and in order to dispose of superfluous plenty, the ministry granted a new en-

[b] This and the two next paragraphs are extracted from a little book, intitled, *Avantages & Desavantages de la France & a Grande Bretagne par rapport au Commerce*, 12°. 1754.

couraging liberty of exportation, till the ſaid grain roſe to two pounds eight ſhillings a quarter. At the ſame time, a duty was laid of five ſhillings and four pence a quarter on *imported* wheat, which duty, in the year 1670, was advanced to ſixteen ſhillings (or near one third the value of a quarter) which amounted in effect to a prohibition.

The government had reaſon to be ſatisfied with theſe prudent meaſures, and extended its views on the ſubject immediately after the revolution, by allowing a bounty of five ſhillings a quarter upon wheat to the exporter. *This was the ſecret ſpring that gave new motion to agriculture, and preſerved that ſuperiority we juſtly boaſt of at preſent.*

At the time abovementioned, and in two ſucceſſive reigns, [c] a proportionable gratification was allowed on exported rye, barley, malt, oat-meal, &c. So that, in the year 1750, the bounty-money amounted to 325,405 *l.* and, when this bounty-money ran ſo high, the price of grain, at home, was extremely moderate. Thus, ſuppoſing the government to grant 200,000 *l.* every year, by way of gratuity, to encourage cultivators, the nation, in general, will gain 1,500,000*l* from the ſingle article of exporting corn.

Beſides, whatever promotes the culture and produce of corn (as theſe laws naturally do) multiplies cattle neceſſary for labour, and increaſes the quantity of food for man, and manures for the ſoil: So that to promote tillage is, in other words, to encourage paſturage; the firſt advances the ſecond, and, afterwards, they mutually aſſiſt each other. Nor does hardly any tract of ground in the world lie ſo commodious for exportation of corn, as *England*; for ſcarce a village of it is ſituated farther than 70 miles from the ſea, ſo that all cultivators, with a little variation of more or leſs, enjoy the benefits of this

[c] Vth of queen *Anne*; IIIº. of *George* II.

this national bleſſing; and, let *Du Hamel* and *Intieri* contrive government-magazines for grain, with the capacity of *Vitruvius* or *Palladio*, yet ſtill the beſt public granaries are vaſt tracts of country covered with corn.

England, in a fruitful harveſt, can produce corn enough (upon ſuppoſition that none was ſent into foreign countries) to ſupport its inhabitants for *four* years. This is ſufficient argument for exportation, whoſe great advantages will appear from the following remark; which is, that *England*, in five common years, namely, from 1745 to 1750 incluſively, ſhipped off, in grain of all ſorts, to the amount of 7,405,786 pounds *ſterling*, [d] which, as has been obſerved elſewhere, is equivalent, in national advantage, to 21,000,000 in money, raiſed by manufactures exported, when the materials are not our own production. Beſides which, the freightage of almoſt all the grain abovementioned [e] was paid to proprietors of *Engliſh* bottoms: And the care of raiſing this overplus of corn gave employment and ſubſiſtence to abundance of people. [f] —States that have no laws prohibiting the exportation of corn, are always beſt provided with bread: And again, when they forbid free ſale and exportation, they live in ſuch a caſual precarious manner as to ſeem, without ſpeaking figuratively, a ſort of rent-charge

 upon

[d] On the reviſal of this ſecond Edition, the Author is conſcious from the ſuggeſtions of his own mind, that he painted matters a little too ſtrongly in the article of the exportation of corn, being dazzled and miſled by certain eminent *French* Writer.

It is his cool opinion now, that nothing can give plenty to *England*, but a prohibition of exporting corn till the nation has recovered its ſtrength *(namely, for five years;)* and that an order be enacted that no farm ſhould be let for the future at more than 200 *l.* a year rent. This will anſwer the point deſired, or nothing can.

——— *Lector, patientem accommodet aurem.*

[e] About 633,650 *l.*

[f] *Advantages & Deſavantages de la* France *& de la* Grande Bretagne *par rapport au Commerce*, 12°. 1754.

upon Providence.—From whence one may fairly draw two concluſions: The ſtates which purchaſe *exported* corn from us, are, to a certain degree, *our tributaries:* And that every country of moderate fertility, which buys *ſuch* corn of us, either neglects huſbandry, or has not ſufficient hands to employ in it.

Rome, though miſtreſs of the world, happened not to underſtand this good policy: For by prohibiting the exportation of grain on the one hand, and giving no encouragement to trade and commerce on the other, ſhe ſubſiſted literally from hand to mouth, or, in other words, procured food for her ſubjects in a forced precarious manner; whilſt *Carthage*, *Tyre*, and *Athens* (countries originally leſs fertile than the *terra potens ubere glebæ* [f]) enjoyed food of all uſeful kinds in great abundance. And thus it is, that the ſame liberty of exportation [g] (which, as we have obſerved, ſharpens human induſtry, to ſuch a degree, as to render half-barren countries fertile) ſupplies *Spain*, *Portugal*, the ſouth of *France*, *Genoa*, and the other ſea-coaſts of *Italy*, with foreign corn. The ſame liberty makes its way over the barriers eſtabliſhed by ſovereigns, and ſpreads from *Dantzic*, *Stetin*, and *Hamburg*, over the vaſt inland tracts of *Germany*. Nay, *Holland* is a public reſervoir of imported corn, whilſt its own moraſſes are quite unfavourable to ſuch production.—But the beſt of all public granaries or magazines, the cheapeſt, as well as moſt uſeful, and leaſt dangerous, is only to be eſtabliſhed on the baſis of a full and free exportation of corn.

On

[f] *Italy.* VIRG.

[g] The reader may ſee the full advantages of it ſet forth at large, in a ſcarce curious work, intitled, *Le Detail de la France*, 1695. The author was *Pierre le Peſant*, *Sieur de Bois Guillebert*, advocate-general of *Rouen.)* See alſo the Memoirs of the Count *de Boulainvilliers*, fol. tom. I. p. 286.

On the other hand, without this liberty of exportation, a plentiful harveſt, when nature beſtows all her bounty for the ſupport of man, affords, at the ſame time, but a melancholy proſpect to the laborious cultivator;

———*Inopem me copia fecit.* [h]

And this is often the caſe with husbandmen, if they cannot diſengage themſelves from the ſuperfluity of plenty, at a tolerable profit. But, as nature never intended to beſtow her bleſſings in vain, a permiſſion of free vent and exportation makes this particular inconvenience an univerſal convenience, and, therefore, ſeems to be pointed out to us by Providence, that none of God's creatures, even in their own private thoughts, ſhould repine at plenty, and wiſh for a certain degree of ſcarcity.

This makes it highly expedient for governments to procure and encourage the exportation of corn; for, otherwiſe, years of abundance (except ſome phyſical accident intervenes) are uſually followed by years of ſcarcity; partly from the natural viciſſitudes of things, and partly becauſe the cultivator is diſmayed with the low price of

 corn,

[h] *M. Du Hamel* has calculated and proved, that a little farmer, with no money before-hand (and that more particularly in countries where exportation is prohibited) muſt, with all his care, be greatly injured in a cheap year of corn, inſomuch, that he cannot retrieve his affairs, except with extrardinary difficulty. Something of this ſort may be obſerved even in *England*.

It is a remark, likewiſe, made by foreigners, that in ſome years of plenty, in countries where there is no exportation, it is better œconomy in the huſbandman to fatten kine, hogs, and fowls, with corn of an inferior kind and quality, than ſell the ſaid grain at a market-price. Which obſervation may ſometimes (but very rarely) hold good in *England*.

corn, and, of courſe, neglects to ſow one third of his lands that are proper for producing it. For it is the price, and not the quantity of grain, that animates the huſbandman, and ſets the plough in motion.

Next to allowing *exportation of corn*, *draining of fens and moraſſes*, *and recovering lands from the ſea*, may be looked upon as the capital improvement in *Engliſh* husbandry: And, as the effects of this noble undertaking continue in a good degree of ſtrength to the preſent hour, it may ſafely be aſſerted, that *England* has gained, for more than a century paſt, half a million a year, at leaſt, from the ſaid ſingle improvement; not to mention the acquiſition (if one may ſo ſpeak) of ſo much land in fee-ſimple: For land, recovered to husbandry-purpoſes, is the ſame as conquering a new country. Now, if my account ſtands right (and it comes from the beſt authority extant) our kingdom, in the ſpace of a few years, till the year 1651 only, had recovered, or was on the point of recovering, in *Lincolnſhire*, *Cambridgeſhire*, *Huntingdonſhire*, and *Kent*, 425,000 acres of fens and moraſſes, which were advanced in general, from half a crown an acre, to 20 and 30 ſhillings. So that perhaps few Stateſmen and Generals have better deſerved a ſtatue or monument from this country, than *Vermuyden*, the principal undertaker [1].

Nor is *incloſing downs*, *heaths*, *and commons*, leſs uſeful than draining fens. For thus barren lands, or lands next to barren, are rendered highly advantageous to ſociety, and more people are ſupplied with food: Property becomes better ſecured, or at leaſt profit; and the cottager, if he be induſtrious, re-

[1] He was a *Fleming* by birth, and a Colonel of horſe under *Cromwell*, but had before ſerved in *Germany* in the thirty years wars.

receives as much from his ground as the ground is intrinsically worth. Whereas in the wild, and, as one may say, uncultivated state of nature, those proprietors that have a great live stock, consume all the herbage in the latter end of spring, and the beginning of summer, favouring their own pasturages, and having a secure retirement for their cattle, when the lands in common can afford no more food, whilst the poor peasant's only cow or horse have no place to retreat to. Such considerations induced one of our ancestors to observe, at a time when all *England* was divided into parties for and against this very article, "That the poor man who is Monarch of but one inclosed acre, will receive more profit from it than from his share of many acres in common with others [k]." And therefore it was both generous and politic in a neighbouring King, about 2 years ago, to give up for the sake of the poor, more than two hundred thousand waste acres, to be divided into small parcels for the emolument of the community: Which ground (supposing it to be of an inferior quality) will afford food for forty thousand new inhabitants. From whom and their descendants will arise a considerable national strength, as well as increase of population in half a century.

Yet *Ket*'s rebellion in *England* may be called a rebellion against inclosures; nor was it the first time that the populace did not see their own true interest.

I will only add under this article, that many *Royal forests* and *chaces* (with the consent of our most Gracious Sovereign) might be applied to much better husbandry uses than they answer at present: The more profitable part of the timber being still

[k] Fuller's *Holy State*.

preſerved: New plantations of timber-trees might alſo be made, and various common fruit-bearing trees, as apple-trees, walnut-trees, cherry-trees, pear-trees, &c. might be placed in the new divided fields at a diſtance of threeſcore feet in every ſenſe. Thus the trees will proſper exceedingly, and incommode, as little as may be, the corn or graſſes underneath. *Quickſet hedges* properly planted, weeded, and pruned, (three plants deep at leaſt, and diſpoſed in the following manner ⁘⁘⁘

at ſtated periods.——I ſhall ſay nothing of the defenceleſs condition of their dividends, be they ſmall or great.——Thus the apparent liberty which the freeholders enjoy, in the preſent inſtance, is a real ſlavery: And productive of loſſes, vexation, or at leaſt perpetual little uneaſineſſes.—But as it is next to impoſſible to convince the lower ſort of people that they are prejudiced; or that they counterwork their own true intereſts; I think *M. du Hamel* and myſelf may lay aſide our lamentations upon this article: However *England* (Heaven be praiſed!) boaſts an happineſs to which *France* is a ſtranger; for, if the freeholders of any pariſh with us concur unanimouſly in petitioning the Legiſlature to have this grievance removed, they find themſelves redreſſed with ſpeed and chearfulneſs.

It may be ſaid that the *incloſing and dividing of common-fields* will (by rendering the ground more manageable and convenient for culture) contract the national husbandry-labour, and conſequently many ſtrong uſeful hands may want work.

This objection has its weight: And, in another part of the preſent Eſſay [m], I have eſpouſed the opinion, ſpeaking of machines in ſpinning, *&c.* where one perſon performs the work of ten or twenty, but in the particular caſe now before us I ſee nothing to fear; becauſe the reducing into culture one million of waſte acres at leaſt (a work which ſtill remains to be carried into execution, and upon which conceſſion a part of my plan is founded) will find ſupplementary employment for the ſeveral peaſants that may be debarred from the means of gaining a livelihood by the incloſure and diviſion of common fields into diſtinct ſhares.

Add to this, that the *new* husbandry requires *one third proportion more of hands* than the *old* huſbandry;

[m] Pag. 25.

bandry. And therefore *a part of it at leaſt* (for I have never recommended the *whole* to common farmers) ſeems to be reſerved by Providence as a ſuccedaneum for aſſiſting countries when they become very populous [n].

Having thus far conſidered the removal of ſome few national impediments to husbandry, it is at leaſt a ſmall ſatisfaction to obſerve, that Noblemen and Gentlemen who have great landed poſſeſſions, are, in the ſenſe of agriculture, a ſort of incontroulable Sovereigns. They may make many of the aforeſaid improvements in their own demeſnes; and poſſibly the example will have no ſmall influence on their neighbours.

I will now return to the general ſtate of husbandry in *England* about the time of the Reſtoration and ſome years afterwards; when *Evelyn* in the laſt century, and *Tull* in the preſent, opened a new ſphere for the minds of mankind to range in: Since which period ſeveral good improvements have been made in *Engliſh* husbandry: and various uſeful hints have been ſuggeſted occaſionally by Mr. *Miller*, wherever he had opportunity to conſider the culture of artificial graſſes. Nor muſt we here omit our own *Engliſh Linnæus*, Dr. *Hill*, who, in the *Continuation of his complete Body of Husbandry*, has turned his thoughts particularly towards diſcovering and introducing new ſorts of vegetable food for the ſupport of cattle, in imitation of the late practice in *Sweden*. Conſiderable attention alſo has been paid to the ingenious and very curious remarks upon *graſſes*, by Mr. *Stilling fleet*, who has given us theſe northern diſcoveries in more full detail.

In *Scotland* many ingenious perſons have formed themſelves into ſocieties for the advancement of agriculture, which, if carried on with zeal and induſtry, may

[n] *Eſſay* II. *Sect.* the laſt.

may prove, in time, an article of great importance to that nation. Dr. *Home* has given his countrymen moſt of the aſſiſtance that chymical experiments can afford, and the late Duke of *Argyle*, with ſome others, have performed as much, or more, in the practical parts. But concerning the defects and omiſſions in *Scottiſh* husbandry, as alſo the cauſes that occaſion them, together with the manifold improvements that remain to be carried into execution, I ſhall refer to a candid and ſenſible account lately publiſhed by a writer of that country who muſt be a good judge of the matter in queſtion °.

Ireland, as long ago as about the middle of the laſt century, began to make no inconſiderable figure in the art of agriculture. The ſoil, in many places, is rich, deep, and manageable. The land of few countries ſeems to be more proper for the culture of flax and hemp, and no nation expends more money with foreigners for the materials of ſail-cloth, cordage, *&c.* than *England*. Now hemp ſucceeds no where better than in a *well-drained moraſs:* And conſequently might be raiſed in *Ireland*, with great ſucceſs, and equal profit. I mention only this ſingle inſtance, becauſe it ſeems to be of great importance both to *Iriſh* and *Engliſh:* Being certain, in other reſpects, that every uſeful ſort of grain or graſs might be made to flouriſh as well in *Ireland* as in *England*—*Tacitus*, with great juſtice, made much the ſame remark in ancient times: *Solum cœlumque, cultus & ingenia hominum haud multum a Britannia differunt.*

Indeed the *French*, with all their boaſted refined politics, prohibit their ſubjects from making amelcorn

° Wallace's *Numbers of Mankind*, p. 150—159. See alſo a *Diſſertation on the chief obſtacles to the improvement of land in Scotland*; publiſhed at *Aberdeen*, 8vo. 1760.

corn into ſtarch and hair-powder, under pretence of always wanting bread :) though one pound, thus manufactured, (all expences deducted) ſells for more than two pounds of the ſaid native amel-corn reduced to flour, and applied to making bread. But the example here alledged, carries with it no ſufficient reaſon why a nation ſhould ſend its money abroad in order to purchaſe *that* which may be raiſed at home by its own ſubjects.

Ireland, it muſt be confeſſed, had a wretched method of huſbandry, and ſtrong prejudices in behalf of *that* method till about the middle of the laſt century, when *Blythe* alone, (who then lived in *Ireland)* was ſufficient to open mens eyes by his incomparable writings. But the truth is, that he, and many other *Engliſh* Officers and ſoldiers of *Cromwell*'s army, being inriched by military grants and ſettlements, firſt laid the right foundations of husbandry in that kingdom ; ſince which period, a certain ſpirit of improvement, more or leſs, has been promoted and carried on with ſuch zeal and conſtancy by the Nobility, Gentry, and Clergy, that they may ſeem to caſt a ſilent reproof on the nation that was their firſt inſtructor. So that if they go on thus for one or a couple of centuries more, and are, at the ſame time, powerfully and generouſly encouraged, it may perhaps be ſaid, with no ſmall degree of propriety,

Thus old *Romano* bow'd to *Raphael*'s fame,
And ſcholar of the youth he taught became. [n]

In proof of this, the tranſactions of the *Dublin-ſociety* for encouraging husbandry are now cited by all foreigners in their memoirs relating to that ſub-

[n] *Dryden*'s Epiſtle to *Congreve*, who was a Gentleman of *Ireland*.

ſubject [b]; And having mentioned *Blythe* during the interregnum, it would be injuſtice in me to overlook a Gentleman of *Ireland* [c] who, by his generoſity and activity (all circumſtances being rightly conſidered) has done more towards encouraging agriculture, manufactures, and employing the induſtrious poor, than any ſubject of ſuperior rank and fortune, either in his own or other countries.

Yet, upon a cool reviſion of the ſtate of agriculture in *Ireland*, it will be a great point gained, if the Nobility and Gentry animate themſelves ſo far, as to carry huſbandry to ſuch lengths as the nature of preſent circumſtances will admit: Which ſo long as they continue, will prove an inſuperable bar to the bringing culture and commerce to its utmoſt poſſible perfection, in that country.—Nevertheleſs, even as things now ſtand, if the ſoil of this latter kingdom were duly cultivated, and exportation of corn allowed, with a bounty annexed, *Ireland* might be brought to maintain two millions more of inhabitants than it does at preſent.

Upon the whole I can only ſay that, if *Ireland* was incorporated with *England*, in the manner ſome have ſuggeſted, the *vis unita* of the *Britiſh* empire would be equal, if not ſuperior to any one Power in the world. Nor is it of much conſequence to our common Parent and Sovereign, nor to his ſubjects, where the ſtrength lies, ſuppoſing it can be exerted whenever it is wanted. It is a pleaſure to ſee united kingdoms reſemble (in ſome degree at leaſt) the *united kingdom of the univerſe*, where the ſun *ſhineth upon all*, and the *dew falleth on all*.

We

[b] Eſpecially on the ſubject of raiſing and managing flax. See, amongſt others, the *Memoirs Oeconomiques Rurales de Berne*. Tom. I. 160. 387. Tom. II. 305.

[c] Dr. *Samuel Madan*.

We will now caſt our eyes on the preſent condition and improvements of agriculture in other parts of *Europe*, and mention ſome few particularities, that may not be known to the generality of readers.

I the rather chuſe to undertake this taſk, as I had opportunities of obſerving, for many years, the actual ſtate of huſbandry in *France*, *Switzerland*, *Italy*, *Germany*, and the annexed provinces of the Houſe of *Auſtria*.

After the peace of *Aix la Chapelle*, almoſt all the *European* nations, by a ſort of tacit conſent, applied themſelves to the ſtudy of agriculture, and continued to do ſo, more or leſs, even amidſt the univerſal confuſion that ſoon ſucceeded. The FRENCH found, by repeated experience, that they could never maintain a long war, or procure a tolerable peace, without they raiſed corn enough to ſupport themſelves in ſuch a manner, as they ſhould not be obliged to ſubmit to harſh terms on the one hand, or periſh by famine on the other. Their King (in imitation of a laudable policy in *China* [e], where every perſon that has made any remarkable improvements in huſbandry is created a Mandarin of the eighth claſs) vouchſafed to give public encouragement to agriculture, and has been preſent at the making of ſeveral experiments. The great and rich, of various rank

[e] The Emperors of *China*, by way of ſetting an example to their ſubjects, plough a few turns once every year, and ſow ſeveral ſorts of grain and graſſes uſeful in huſbandry : Their Deputies of the provinces do the ſame, as alſo the Nobility. Reports are made at Court of the ſucceſs and good management of the cultivators, and ſuch as excel in agriculture are *ennobled* for life.

Agreeably to this *Hyde* tells us, that, amongſt the ancient *Perſians*, the Kings quitted their grandeur one day in the year, and eat with the huſbandmen, in order to ſhew their regard for the art of agriculture. *De Relig. vet. Perſarum.*

It is therefore a received political maxim in *China*, whenever an individual does not work, that then ſome correlative individual in the kingdom wants bread.

rank and ſtations, followed *this* example: The very Ladies put in for their ſhare of fame in ſuch a commendable undertaking; nay, even aged King *Staniſlaus* (like another *Diocleſian* in his retirement from a throne) amuſes himſelf with husbandry in the ſolitudes of *Lorrain*, and has even correſponded on the ſubject.

France gave a wiſe attention to husbandry, even during the hurry and diſtreſſes of her laſt war. Some prize queſtions in rural œconomics were *then* propoſed annually, particularly by the two Academies of *Lyons* and *Bourdeaux*. Many alterations for the better were made by the Society for improving agriculture in *Bretany*.

Since the concluſion of the peace, matters have been carried on with great vigour. The Univerſity of *Amiens* has made various propoſals to the public, for the advancement of husbandry; whilſt the Marquis de *Tourbilli* (a writer who goes chiefly on experience) has the principal direction of a *georgical* Society eſtabliſhed lately at *Tours*.

That at *Rouen* likewiſe deſerves our notice [h]: Nor have the King and his Miniſters thought it unworthy of their attention. The Archbiſhop of the dioceſe is one of the members. [i]

I will add nothing farther on this ſubject, except that no longer ago than in the year 1761 there were *thirteen* ſocieties exiſting in *France*, eſtabliſhed by Royal approbation, for the promoting of agriculture; and theſe *thirteen* Societies had *nineteen* cooperating Societies belonging to them, whenever it hap-

[h] See *Deliberationes and Memoires de la Societé Royale d' Agriculture de la generalite de* Rouen, 8vo. Tom. I. 1763.

[i] This humane and conſiderate Prelate (M. de la *Rochefaucault*) deſtroyed, when he firſt came to his dioceſe, a large warren of hares and rabbits, which he found on his demeſnes, merely becauſe they did great damage to the neighbouring huſbandmen.

happened that a diſtrict was too large to be effectually taken care of by one Society.—If our nation is not in a lethargy, I think *this* may be ſufficient to awaken it.—A ſtolen march occaſions the worſt ſort of defeat either in war, or political adminiſtration.

In the year 1756, his moſt Chriſtian Majeſty iſſued out an edict, by which he exempted from land-tax, (that is to ſay, in fields newly broken up) for the ſpace of twenty years, all cultivators of madder in drained marſhes and other waſte neglected grounds. [But at the ſame time let it be remembered that public encouragement in *France* was given to the draining of fens and bogs, firſt in the year 1607, and then in 1641.]

As a proof that ſomething has been done in the culture of madder, the Board of Agriculture, held at *Beauvais*, made it plain, in the year 1762, to all perſons concerned in *dying*, that madder raiſed in *that* diſtrict, and (contrary to common cuſtom) uſed, when the roots are freſh gathered, gave a finer tincture than the *Zeeland* madder, and went farther in a proportion of 8 to 5.

Auguſt 16, 1762, it was alſo ordered in Council that no tax, for the ſpace of *twenty* years, ſhould be levied from grounds newly broken up; provided the ſaid grounds had lain twenty years in an uncultivated ſtate.

Many other encouragements have been ſince given to the cultivators of lands: And, if I miſtake not, all pacquets and letters of correſpondence to and from moſt of thoſe Societies lately eſtabliſhed, are exempted from the payment of poſtage.

Nevertheleſs it is not remote from my purpoſe to obſerve, as I am here ſpeaking profeſſedly of *French* agriculture, that the huſbandman in *France* muſt pay ſix per centum intereſt for money; which circumſtance

ſtance greatly retards all improvements; whereas in the canton of *Berne*, an adjoining country, he only pays four, and ſometimes leſs; but then, on the other hand, labour is cheaper in *France* [a] than in *Switzerland* or *England*: And the vineyard, in the two former countries, employs abundance of aged men half paſt their work, not to mention women and children.—But this may happen in our country alſo, if the *new huſbandry* takes place *in part only*; and concerns itſelf no farther than in raiſing artificial graſſes, and keeping them clean, which will afford as much employment for the weak and aged as the culture of vines

I may add farther that the farmers in *France* have more the appearance of vaſſals in *Hungary* and *Poland*, than of free tenants. The eſtates they rent

E

are

[a] The price of a man-reaper in *France*, two years ago, was ten-pence a day, and that of a woman-reaper half as much: Whereas, in many parts of *England*, the farmer paid two ſhillings, and two ſhillings and ſixpence to the men, as likewiſe proportionably to the women, and allowed them ale.

In ſome inſtances I am inclined to look upon the *French* as defective in what we call *rural œconomics*: For in *Anjou*, and many other diſtricts of *France*, the farmers give the taſker or thraſher a *ſeventh* part of the grain thraſhed, which appears to me unthrifty management; ſince a briſk taſker with us will thraſh *eight* buſhels of wheat a day, week after week; and a *ſeventh* part of a *quarter* of wheat, by way of wages, is beyond the *quantum meruit* of the labour.—Beſides, when a work-man is paid upon this footing, he will never thraſh clean, that being loſs of time and profit to himſelf; for the ripe corn *brits* out apace with the firſt ten or twenty ſtrokes of the flail, but it requires much patience, drudgery, and honeſty, to work all the wheat clean from the ſtraw.

As *France* is warmer than *England*, and wheat is there ſown earlier than with us, it is my private opinion, that a good thraſher may diſengage the grain from the huſk, more eaſily than our work-men can, and make greater riddance in a day.—Thus much we know from experience, that drilled wheat is thraſhed with more facility than wheat commonly ſown; becauſe the plants, by having room, air, and ſun-ſhine, acquire greater maturity.

are too ſmall. The occupant looks neither ſo contented nor ſo *warm*, in *every* ſenſe, as the *Swiſs*, *Bohemian*, *Saxon*, or *Auſtrian* boor; but ſeems to have ſprung, like a muſhroom, from the ſoil beneath him. The *res anguſta domi* hinders him from *uſing what he approves*. His waggons, ploughs, and other inſtruments of huſbandry are contrived more for cheapneſs than quick diſpatch of labour: The ſtrength of his working cattle is mean and contemptible. His *leaſes* alſo are of too ſhort a duration for a tenant to aim at making improvements; which affects both *him* and the proprietor of the ſoil. Yet many encouragements under this article have been allowed, ſince the concluſion of the war.

A farther collateral defect ſtill remains. It was bad policy in *Colbert* and his ſucceſſors to tax the exportation of the huſbandman's cattle, as alſo the exported productions of his farm, ſuch as cheeſe, butter, dried fruits, *&c.* and at the ſame time exempt from duty the works of manufacturers.

Nor does *France* foreſee one inconvenience in her boaſted ſchemes of agriculture at preſent: For, when ſhe has diſcouraged the increaſe of vineyards, and augmented the culture of corn, there will be found a deficiency of able-bodied men to carry on the work, as alſo of ſtrong labouring cattle. Not but that her cattle may be enlarged in ſize, and multiplied in number, by cleanſing, breaking-up, and incloſing large tracts of waſte land, and raiſing artificial graſſes, where the ſoil is capable of receiving them. But the *firſt* difficulty it is not in her power to remove at preſent: And it is highly problematical, whether ever ſhe may be enabled to get over the *ſecond*.

There is another remaining obſtacle, *inſtar omnium*, which will never be ſurmounted till the *French*

writers of husbandry have eradicated the prepossessions and folly of a whole nation.

Permit me also to observe, in the second place, that one may venture to pronounce, without prejudice, that agriculture, *cæteris paribus*, will always flourish most in *free governments* and *Protestant countries*; and, not to go far for an illustration, it is highly probable, that the canton of *Berne* (a soil more mountainous, less manageable, and inferior to *France* in natural fertility) will, in a few years, exceed that country in husbandry-improvements, tho' *France* had gained a march of eleven years before the *Swiss* began to move. I shall say nothing of the number of holidays in *Popish* countries (as *M. de Fronteboſc*, a *French* author, [b] has prevented me on that subject) but return to my more general design.

The art of agriculture, at present, is publicly taught both in SWEDISH, DANISH, and GERMAN universities, where the professors [c] may render their respective countries great service, if they understand the practical parts as well as the speculative ones, and can converse to advantage with the farmer and peasant, or with *Virgil* and *Columella*.

ITALY, likewise, has not been inactive. The *Neapolitans*, of the present age, have condescended to return back to the first rudiments of revived husbandry, and began to study afresh the agriculture of *Crescenzio*, [d] which had been published in the year 1478. The people of *Bergamo* have pursued the same track, and given the world a new edition of the *Ricordo d' Agricultura di Tarello*, which was

[b] *Memoires sur le Fêtes*, par l' rapport à l' Agricult. 8°. 1763.

[c] They are called *Professores Oeconomici*.

[d] A new edition, in 2 vol. 8°. was published at *Naples*, in 1724.

firſt printed at *Mantua* in 1577, and afterwards, twice at *Venice*, in the years 1622 and 1629, but, at length, became almoſt as rare as a manuſcript. [e] —Nay, with regard to NAPLES, in particular, the late queen, [f] daughter of the late king of *Poland*, founded work-houſes for employing the poor in every province of the kingdom, which houſes are now become flouriſhing manufactures, inſomuch, that one can hardly ſee a beggar in the ſtreets.[g]

The duchy of TUSCANY has kept an equal pace with the kingdom of *Naples*. A private gentleman, of late years, left his whole fortune to endow an academy of agriculture. The *firſt eccleſiaſtic* in that duchy is preſident of the ſociety, and many of the chief nobility make the members.—Even FERRARA, a ſmall territory in the Papal dominions, has contributed its juſt contingent, and made ſome laudable attempts in matters of huſbandry:

Major in exiguo regnabat corpore virtus;

Agreeable to the obſervation which *Statius* made upon little *Tydeus*.——Indeed, this country affords room for admitting ſeveral good improvements in agriculture, and particularly in what relates to the draining of fens. The ſoil, in itſelf, is rich and deep, but the lands are ſo poorly inhabited, that hardly a ſufficient number of hands can be found to mow the meadow-graſs, of which there is great abundance.

Ani-

[e] The preſent new edition was printed at *Bergamo*, in 4°. 1756

[f] This princeſs ſcarcely uſed a ribband, or a pin, but what came from *England*. A captain of our nation, who conſtantly freighted to and from *Naples*, gained a little fortune, by ſupplying her with millenary goods and trinkets

[g] This paſſage was written in the year 1758.

Animated with a desire, that the people, under his government, should excel in husbandry, his SARDINIAN majesty has sent subjects to learn the practice of foreign countries, and made many attempts to establish a better kind of agriculture amongst his people.

In POLAND, where a natural fertility of soil seems to dispense with the necessity of calling in improvements, *M. de Bieleuski*, grand-marcéchal of the crown, has made abundance of successful attempts to introduce the *new husbandry* amongst his countrymen, and procured the best instruments for that purpose from *France*, and other parts of *Europe*.

The HOLLANDERS give little attention to agriculture, if we except only one single collateral instance, which is the draining of fens and moraſſes, and that proceeded more from self-preservation, than any particular turn towards husbandry. Nor is their soil, in truth, good for much, unless it be the producing of a coarse ordinary luxuriant grass. Nevertheless, these people (at least, in former ages) were a pattern of *industry*. Even, at present, they raise little corn, yet contrive to provide enough for themselves and other countries. Without timber of their own, they use more than any nation of the same extent of territory: And that particularly in ship-building and repairing their dykes and sea-breaches. They raise neither hemp or flax, nor encourage a breed of sheep for wool, yet manufacture more of all these materials than any people, except the *English* and *French*. They have no wine, yet consume a greater quantity than those nations that cultivate the vineyard, and, at the same time, supply many northern countries. Thus, where industry prevails,

——*Omnis fert omnia tellus.*

In ſome points, indeed, they are more induſtrious than can be juſtified; witneſs their incroachments on the *Britiſh* fiſheries, and many other inſtances, which it may be needleſs to mention: Since *Dryden* obſerved, near a century ago, that the *Dutch* wanted to poſſeſs, in effect, all the lucrative traffic of the world:

The *Streights*, the *Guiney*-trade, the herrings too;—
Nay (to keep friendſhip) they ſhall pickle you.
Well may they call themſelves an antient nation:
For they were born e're manners came in faſhion;
And their new common-wealth has ſet them free
Only from honour and civility.

In the year 1759, a ſociety eſtabliſhed itſelf at BERNE, in *Switzerland*, for the advancement of agriculture and rural œconomics: Which ſociety conſiſts of many ingenious private perſons, as alſo ſome of great weight and influence in the republic; moſt of them men of a true caſt for the improvement of huſbandry, being enabled to join the practical parts with the theoretical ones. They have already given us two large volumes in 8vo.[g] They have appointed premiums as marks of diſtinction, and propoſe to continue this their laudable undertaking every year.

The *Canton* of BERNE ſeems to be a tract of land no-ways unfortunately circumſtanced, all things conſidered, for receiving improvements in agriculture: For, though the ſoil, in general, is harſh and mountainous, yet the zeal of the governors and induſtry of the inhabitants may greatly counterbalance thoſe original defects. Add to this, that the government is mild and equal; the religion of the people ſincere and plain; the rich are reſtrained by ſumptuary laws; the

[g] The title is *Recueil des Memoires concernants l' Oeconomic Rurale* de Berne, à Zurich, 1760, 1761.

the peasants are parsimonious, frugal, robust, sober, and fruitful; in the latter instance particularly: Far beyond any thing that can be found among most of the inhabitants in the western parts of *Europe*. Their taxes are small, the purchase of land moderate, and the interest of money not high. Their possessions are circumscribed and bounded, which follows by a sort of analogy, from the very nature and principles of their republic: And this circumstance contributes to render the country both strong and happy. It is farther remarkable, that no one territory in *Europe*, of the same size, abounds so much in springs, rivers, and lakes; (with few, or no very large morasses at the same time) nay, great reservoirs of water are frequently found on their highest mountains.—The inhabitants, without any assistances from the ocean, are no-ways ill situated for selling to their neighbours whatever they can produce; being placed, in a sort of central point, between *Italy*, *France*, and the Empire. It is their business, at present, to advance tillage so far, as that they may be enabled to supply their wants to the full, and send some corn into neighbouring countries every year. For this country, almost half a century ago, raised more grain, generally speaking, than its inhabitants could consume; and, at that time, one of the best authors, who has written concerning them, pronounces the *Switzers* to be some of the ablest husbandmen in *Europe*.[h] But, be that as it will, the genius and cast of their soil leads chiefly to pasturage and the improvement of artificial grasses, as well as all other sorts of vegetable food for the support of cattle, the sale of which, of late years, has been the principal trade of *Switzerland*. And as to improving the breed, not only of cattle, but draught-horses especially, public

[h] See *the account of* Switzerland, *in* 1714, [by *Stanyan*.]

care has been taken, by calling in all assistances from *Holstein* and *Friseland*.

It has been observed already, that the greater part of land, in the canton of *Berne*, is harsh and mountainous, but exceptions for the better are not uncommon.

Finer corn-countries can hardly ever be seen than in the *Argæw* and other districts. Almost the whole *Pais de Vaud* is as beautiful as the best parts of *Berkshire*, nor much unlike them; particularly near the lake of *Yverdun*, and in the tract of land between *Meudon* and *Morat*.

Some water-meadows, of natural grass, have been mown for hay three times in a year: [a] But the grass that grows on the sides of the *Alps*, and on the tops of some of them (where, sometimes, you see lakes and large plains) gives a delicious aromatic taste to milk, which will hardly be found in other countries. —— A great number of vallies, even in the *German* province, are equal in fertility to the *Campania Felix*, and, perhaps, superior in the beauties of landscape. But, as the names of many of them have escaped my memory, the assertion may be corroborated by a collateral proof. —— The valley of *Lin-*

[a] The *Swiss*-cheeses, called *gruyéres*, are well known at most of the polite tables in *Europe*. They are much inferior to our north-*Wiltshire* and *Gloucestershire* kinds, having a rancid taste, and being full of air-holes, which contain an acrid moisture in them. This is not owing to any defect of the milk, which is delicious, but may arise from various causes; such as keeping the cream too long in hot weather, or not being provided with excellent rennet; to procure which, I hardly know any operation more nice and difficult. Much also may be attributed to want of skill in the dairy-woman, or a neglect of keeping the dairy-vessels perpetually clean with scalding water.

But the cheese, called *Schapziger*, (made principally in the canton of *Glaris*) has, in its kind, no equal: And, perhaps, the power of the juices of the six vulnerary herbs mixed with it helps to correct that acid fetid leaven, which ferments in the *gruyére*.

Lindenthal, or valley of lime-trees, near *Glaris* (not indeed in the republic of *Berne*, but in a neighbouring Proteſtant canton) exceeds moſt proſpects that a traveller can behold in regards to alps, rocks, woods, torrents, caſcades, the bridge of *Bantenbruch*, [b] and fine meadows. This beautiful valley, in its fineſt part, is about 8 miles long by 3 or 4 broad, not to mention the ſlopes of the mountains which will take half a day in aſcending: So that the whole is juſt as much as the human eye can command diſtinctly.

According to my own obſervations, what the people of *Switzerland* want chiefly at preſent, is to perfect their inſtruments of huſbandry;—to import the fineſt and choiceſt ſeeds of all uſeful ſorts from other countries, but more eſpecially graſs-ſeeds;—to leſſen (in a ſmall degree) their quantity of vineyards, as well as the paſſion for planting new ones; and obſtruct *in part*, but *not intirely*, the migration of their ſubjects. The reaſon of this reſtriction ſhall be aſſigned hereafter, when we ſpeak of the natural affection which the *Swiſs* bear their native country.

Again, if the republic of *Berne* applied itſelf ſtill more to the culture of corn, there would then be leſs need of magazines in moſt of the *bailliages*; nay, if a bounty was extended to ſuch corn as was ſent to neighbouring countries (whenever wheat and other kinds of grain bore a low price) the inhabitants would find the good effects thereof, from the higheſt to the loweſt: And as all manufactures, or any other objects of trade and gaining a livelihood, are trebly advantageous when the materials wrought upon are produced at home, it might not be amiſs, if

[b] This bridge conſiſts of one large arch, which connects two very high alps, covered with ice and ſnow. Beneath it runs a raging torrent, about 400 perpendicular feet under the bridge.

if they manufactured their own wool, goat's hair, *&c.* and employed themſelves more in raiſing flax; for the *Swiſs*-linens are found, by experience, to be the moſt durable of any in *Europe*. Nor ſee I any *phyſical* reaſons, why they might not raiſe mulberry-trees and breed ſilk-worms in ſome parts of their country, and carry on a buſineſs equal to the crape-manufacture at *Zurich*, which all travellers know and admire.—It is a great damp likewiſe to their trade, that a ſtranger is incapable of exerciſing his art, in cities and towns, by reaſon of the excluſive privilege of the inhabitants, which reduces the number of ingenious workmen into narrow bounds, and makes the produce of their labour not only dear, but of an indifferent quality.—On theſe accounts, one fourth part more money goes out of the country than ought to do. [c]

Such, according to the beſt of my judgment, are the *Corrigenda*, (or if that expreſſion may appear ſomewhat too harſh) the few points which deſerve to be re-conſidered with reſpect to the trade and agriculture of the republic of *Berne*.

The ſoil of *Switzerland*, in general, is, perhaps, that very ſort of ſoil, which a ſober, ſenſible, induſtrious nation ought to wiſh for. It pours not forth its vegetable productions ſpontaneouſly; but there is a force of nature in it ſufficient to produce great returns, if virtue and diligence are the cultivators. Its very mountains are its fortifications; nor are ambitious neighbours fond of conquering a country, that will yield them nothing, *except by the ſweat of*

[c] Under this head, *Stanyan* obſerves, who was eight years the *Engliſh* reſident at *Berne*, that the *Swiſs* have not uſes and calls enough at home to occaſion a full circulation of great ſums of money, which lie partly dormant.

Account of Switzerland, p. 178.

of their brows.[d] And this leads me to run the hazard of giving vent to a private conjecture, namely, that moſt republics at preſent (which, by the way, are always ſituated in a ſort of waſte ground, with reſpect to the countries adjoining) owe their duration more to the difficult unmanageable ſpot of earth on which they were eſtabliſhed, than to any particular excellence in their form of government.

The ſagacious *Machiavel* ſeems to think, that a rich ſoil tends to leſſen the induſtry of people that inhabit it; and, if a nation like that of the *Switzers*, is contented with the portion of land it enjoys, and meditates no future acquiſitions of territory, then a tract of earth which yields its productions with *ſome difficulty*, will, in the long-run, make its inhabitants a wealthy, happy, and powerful community.

In proceſs of time, therefore, the canton of *Berne* may be brought to anſwer the deſcription of an old geographer, who compares a country, walled round with rocks and mountains (like *Bohemia*) and circumſtanced interiorly as *Switzerland* is, *to a large piece of lawn, edged round, for ſtrength's ſake, with a ſelvage of coarſe canvas.* For the vales in *Alpine* countries make ample amends for the deficiencies of ſuch parts of mountains as are truly barren.

Nature, in this caſe, in order, to excite human induſtry, ſeems to have contraſted want and plenty, like ſhades and lights in the ſame picture. I have *ſet before thee poverty and wealth*, ſays ſhe, *ſtretch forth thy hand unto whether thou wilt!* Nay, thus much may ſafely be inferred, that a rich ſoil, eaſy to be cultivated, naturally inclines the inhabitants to

[d] Scilicet omnibus eſt labor impendendus, & omnes
Cogendæ in ſulcum & multa mercede domandæ.
Georg. II. *v.* 61.

to indolence and remiſſneſs: And hence it is, that travellers of the beſt ſenſe have remarked, that the cauſe of there being ſo many ſavage nations in *America* is the fertility of the earth, and the vaſt ſupplies of animal food, without care or trouble.

"Obſervations of this nature," ſays *Burnet*, "ſurprized me yet more in the country of the *Griſons*, who have almoſt no ſoil at all, being ſituate (ſituated) in vallies, that are waſhed away, as it were with the torrents that fall from the hills; and yet theſe vallies are well peopled, and every one lives happily and at eaſe under a gentle government; whilſt other rich and plentiful countries are reduced to ſuch miſeries, that, as many of the inhabitants are forced to change their ſeats, ſo thoſe who ſtay behind, can ſcarce live and pay the grievous impoſitions that are laid upon them.

"On the contrary, *Lombardy*, which is certainly the beautifulleſt country that can be imagined, the ground lies ſo even, it is ſo well watered, ſo ſweetly divided by rows of trees, in a vaſt extent of ſoil, above 200 miles long, and an 100 broad, in which the whole country is equal to the lovelieſt ſpots in *England* or *France*, and has all the neatneſs of *Holland* and *Flanders*, but with a warmer ſun and a better air, cauſed by the nearneſs of the mountains; ſo that it ſeems the moſt deſireable place in the world to live in; yet, after all, the government is ſo exceſſive (exceſſively) ſevere, that there is nothing but poverty and beggary over all this rich country; ſo that a traveller, in many places, finds almoſt no thing to ſubſiſt on, if he does not buy his proviſions in the great towns, and carry them with him."

And thus, in *Portugal*, where the ſoil is richeſt (as on the northern banks of the *Duero*) there the inhabitants are pooreſt.

Thus

Thus too in the canton of *Berne*, though the *Pais de Vaud* is, in its nature, by many degrees, a deeper and richer country than the *German* province, yet the beſt huſbandry, and, upon the whole, the beſt crops are to be ſeen in the latter; ſo that in the *better* ſoil the huſbandmen are generally poor, and in the *worſe* ſoil it is not very uncommon to find a farmer worth ten thouſand pounds; and that, for a plain reaſon, becauſe the *German Switzers* are moſt induſtrious.

I am far from exhorting their excellencies, the governors of the republic, to reſtrain their ſubjects from going into other countries, or entering into foreign ſervices, if ſuch migrations are not too frequent and too numerous. For the *Swiſs*, from a natural affection to their native country (a paſſion unknown and unfelt *in the ſame degree* by any other people) always return to their beloved original community: And like induſtrious bees (which, as *Pliny* ſays, *nihil norunt niſi commune* [a]) bring back their little acquiſitions to the public hive at noon or evening. By making migrations in the earlier parts of life, they not only obſerve the agriculture, trade, and manufactures of other ſtates, but diveſt themſelves from the prejudices of their own country, and lay in, at the ſame time, ſuch a ſtock of military knowledge and practice, as to form and inſtruct a militia of 50,000 men, that can be brought into the field at a month's warning; a corps reſpectable to the moſt warlike powers now in *Europe!* for every 10th man, at leaſt, has been a regular ſoldier, and each *baillage* (or *hundred*, to uſe the *Engliſh* expreſſion) can produce its *Fabricii & Cincinnati*: [b]

Or,

[a] *Hiſtor. Natural.* l. xi. c. 5.

[b] Plurimis monumentis ſcriptorum admoneor, apud antiquos noſtros fuiſſe gloriæ curam ruſticationis, ex qua Q. Cincinnatus obſeſſi conſulis & exercitûs liberator, ab aratro vocatus ad dictaturam

Or, in other words, officers of experienced ſervice and veteran commanders. We ſpeak this in particular of the canton of *Berne*.

It may farther be obſerved, that the ſevere froſts in *Switzerland* improve the ſoil: And the waters of their lakes and rivers are rendered more prolific in meadow-lands, *&c.* by being chiefly ſnow-waters. A ſpring wheat might not be unuſeful to them, for reaſons obvious to thoſe who know their winds [c] and froſts in winter, and their powerful heats in ſummer. But, perhaps, even this ſuggeſtion may be needleſs, as their wheat is much protected in winter by the deep ſnows that fall, which not only guard and cover it, but ſerve to manure it.—Setting aſide therefore this conſideration, it may ſuffice to obſerve, that, as the country, here ſpoken of, has a moiſt, black, ſpongy earth, near its lakes and rivers, the inhabitants ought to be particularly diligent in ſearching for PEAT: (which I have taken notice of, more or leſs, in many of the low moory grounds throughout the whole XIII cantons:) For *peat* will afford the inhabitants abundance of fewel, and its aſhes will manure their upland graſſes, [d] and all legumi-

turam venerit, ac rurſus faſcibus depoſitis (quos feſtinantius victor reddiderat quam ſumpſerat imperator) ad eoſdem juvencos & quatuor jugerum (about 2 acres and 3 quarters *Engliſh*) avitum hæreditolum redierit. Itemque C. Fabricius & Curius Dentatus, alter Pyrrho finibus Italiæ pulſo, domitis alter Sabinis, accepta quæ viritim dividebantur captivi agri, ſeptem jugera [4 acres $\frac{3}{8}$] non minus induſtrie coluerit quam fortiter armis quæſierat. Et ne ſingulos intempeſtive nunc perſequar, cum tot alios Romani generis intuear memorabiles duces hoc ſemper *duplici ſtudio* floruiſſe, vel *defendendi* vel *colendi* patrios, quæſitoſque fines. COLUMELLA *de Re Ruſt.* l. i. c. 1.

[c] The wind, called *la bize*, which blows from the north-eaſt, is a black, harſh, cutting wind, being doubly more ſevere than wind from the ſame quarter in *England*.

[d] Peat-aſhes are improper manures for graſſes that grow in water-meadows, there being too great a ſameneſs between the ſoil

guminous plants to great perfection. Indeed, I had neither leisure nor convenience to make any experiments, either on the fewel or the ashes of peat, when I was in *Switzerland*; but if the peat be of the prime sort, or even of an inferior kind, hardly any thing can be found that will contribute so cheaply and effectually to the sparing their woods; and the rather, as a scarcity of timber and firing is justly apprehended by their best writers. Nothing will afford more comfort to the poor, or better carry on the improvement of two-thirds of their pasture-lands.

That republics are better calculated than monarchies, for the advancement of agriculture, is partly true; for most republics (from natural reasons, rather than any strange concurrence of circumstances) are generally situated in a neglected barren soil: And there it is that art and industry make the most shining improvements in husbandry. Add to this, that the common-wealth we are now speaking of, and others of *Switzerland* in a lesser proportion, are living proofs, that there is, in such sorts of government, something analogous to the advancement of agriculture. The inhabitants are free from ambition (at least for a considerable time after the first establishment of their community;) Liberty gives them scope to exercise their industry, and equality excites emulation: For suddenly acquired fortunes out-strip, over-shade, and starve the lesser ones; whilst luxury keeps always in proportion to the inequality of fortunes.—Besides, small shares of property are better distinguished, secured, and bounded: And, at the same time, more capable of admitting a correct and accurate husbandry.

Praise

soil and the manure: For all manures, says *Columella*, "act by contrariety."—They are also unfit for such up-lands grounds as are shallow, gravelly, and apt to *burn*.

Praise great estates—but cultivate a less; [e]

Add to this, that liberty reigns more in places of difficult cultivation that require improvement, than in others which nature seems to have most favoured; for liberty, in a rich plentiful country, falls naturally into licentiousness.—Not but that agriculture may be carried on with great success in *monarchical* governments;—but more especially if they are *free Protestant* governments;—of which *England* (to go no farther) gives a plain example. And thus, in antient times, *Alexandria* flourished as much when the *Seleucidæ* reigned, as *Tyre* did under a republican administration.

The reader, in all probability, may be inclined to think, that I have dwelt too long upon the present state of husbandry in *Switzerland*, and in the canton of *Berne* particularly: But every good Protestant must feel great regard for this industrious community, and wish it all prosperity, both civil and religious. *He that tilleth the land*, (that is effectually, and not superficially) *shall be satisfied with bread.*[f]

I shall therefore only add, by way of encouragement to this wise people, in their present attempts towards reviving and improving the art of husbandry,

[e] *Virgil*, here alluded to, seems to have well illustrated the sentiment of an old *Carthaginian* writer on husbandry; *Imbecilliorem agrum* quam *agricolam* esse debere.

Columella relates an instructive story upon this occasion: "Refert Græcinus in libro de vineis, ex patre suo sæpe se audire solitum, Paridium quendem duas filias, & vineis consitum habuisse fundum, cujus partem tertiam nubenti majori filiæ dedisse in dotem, ac nihilo minus æque magnos fructus ex duabus partibus ejusdem fundi percipere solitum. Minorem deinde filiam nuptui collocasse in dimidia parte reliqui agri. Nec sic ex pristino reditu detraxisse. Quod quid conjicit? *Nisi melius scilicet postea cultam esse tertiam illam fundi partem quam antea universam.*"

De Re Rust. I. IV. c. 3.

[f] Prov. xii. 11.

dry, that *Switzerland* is capable of being rendered *truly* rich, like *Japan*; that is, it may poſſeſs, *in itſelf*, moſt of the uſeful and neceſſary things conducive towards human well-being.—Its governors alſo ſeem to think (and that very juſtly, according to my opinion) that the ſource of real riches conſiſts in the culture of the earth, which feeds the manufacturer as well as the artizan, and gives them an infinite number of materials to work on. Nay, hiſtory tells us, that the *Egyptians*, whilſt they gave their attention to agriculture, had little need of turning their thoughts towards navigation. [a]

Having proceeded thus far in an account of agriculture in general, and its preſent ſtate in *Switzerland*, more particularly, it may be worth obſerving, in the next place, that *Linnæus*, and his diſciples, have performed great things in the north of *Europe*, and particularly in diſcovering new, profitable, wholeſome, and well-taſted food for cattle.—*Sweden*, at the ſame time, has augmented a commerce that had been long cramped within narrow bounds, and beſtowed ſucceſsful labours on a ſoil, which, before was looked upon as cold, barren, and incapable of melioration; of this the late memoirs, publiſhed at *Stockholm*, will be a laſting monument.

Denmark follows the like example, as alſo many courts throughout all *Germany*. His *Daniſh* majeſty encourages, in particular, the manufacture of wool, and has ſent three perſons into *Arabia Felix*, to make remarks, and bring over ſuch plants and trees as may be uſeful in huſbandry, building, *&c.*

At the ſame time, the duchy of *Wirtemberg*, (which is a country no-ways unfavourable to corn and paſturage) has not failed to contribute its aſſiſtances towards the improvement of agriculture:

[a] *Joſeph.* contra Appion.

Having, two years ago, communicated to the public its *æconomical relations* from the preſs at *Stutgard*.

Nor have the ingenious of LEIPSIC, [b] and HANOVER, [c] been inattentive to this great art of ſupporting human kind, and that amidſt all the rage and devaſtations of war. How truly might the inhabitants of thoſe countries have ſaid, for many years paſt, to the *Engliſh* huſbandman?

——*Nos dulcia linquimus arva,*
Nos patriam fugimus. Tu, Tityre, lentus in umbra
Formoſam reſonare doces Amaryllida ſylvas.

Nay SPAIN, naturally inactive upon theſe occaſions, in ſpite of all the prejudices of a bigotted religion, has invited *Linnæus*, with the offer of a large penſion, to ſuperintend a college founded, for the ſake of making new inquiries into the hiſtory of nature, and the art of agriculture. Certainly there is great room for improvement in that naturally rich, but neglected country. The very *Moors* that were baniſhed from thence (to the amount of near 800,000) were better huſbandmen than the native *Spaniards*: Being remarkably eminent for the knowledge of plants, which, in all probability, they derived from the *Carthaginians* and *Arabians*. For one fourth of the names of uſeful plants now in *Spain* (whether medicinal or huſbandry plants) are of *Arabian* or *Mooriſh* extraction.

The

[b] *Journal d' Agriculture* à Leipſic, 8vo.

[c] *Recueils d' Hanovre*, 1759, en pluſieures Parties. The ſame ſpirit is kept alive at the univerſity of *Gottingen*: The laſt premium was allotted to him who furniſhed the beſt diſſertation on the nature of ſmut in corn, and laid down the ſureſt rules to prevent it. His late majeſty *George* II. founded this ſociety in 1751, and a premium is given every half-year.

The inhabitants of *Spain* are too lazy and proud to work. Such pride and indolence are death to agriculture in every country.—Want of good roads and navigable rivers (or, to speak more properly, the want of making rivers navigable [d]) have helped to ruin the *Spaniſh* huſbandry. To which we may add another diſcouraging circumſtance, namely, "that the ſale of an eſtate vacates the leaſe: *Venta deſchaze renta.*" Nor can corn be tranſported from one province to another.

The *Spaniards* plant no timber, and make few or no incloſures. With abundance of excellent cows, they are ſtrangers to butter, and deal ſo little in cows-milk, that, at *Madrid*, thoſe who drink milk with their chocolate, can only purchaſe goats milk.—What would *Columella* ſay (having written ſo largely on the *Andaluſian* dairies) if it were poſſible for him to reviſit this country? For certain it is, that every branch of rural œconomics, in the time of him and his uncle, was carried to as high perfection in *Spain*, as in any part of the *Roman* empire.

Though the *Spaniſh* husbandmen have no idea of deſtroying weeds, and ſcratch the ground inſtead of ploughing it; yet nature has been ſo bountiful to them, that they raiſe the brighteſt and firmeſt wheat of any in *Chriſtendom*. I have ſowed it in *England*, and never taſted finer bread than what was made from its

[d] When a company of *Dutch* contractors offered *Charles* II. of *Spain* to make the *Tagus* and *Muncanares* navigable, from *Liſbon* to *Madrid*, the council of *Caſtile*, having long deliberated on the propoſal, made, at laſt, this remarkable determination: "That, if it had pleaſed God that theſe two rivers ſhould have been navigable, he would not have wanted human aſſiſtance to have made them ſuch; but, as he had not done it, it is plain; he did not think it proper that it ſhould be done. To attempt it, therefore, would be to violate the decrees of his Providence, and amend the imperfections which he deſignedly left in his works."

Clarke's *Letters concerning the* Spaniſh *nation*, p. 284.

flour. Such as propoſe to ſow it with ſucceſs in this country, ſhould venture it into the ground before *Michaelmas*.

If the *Spaniards* would vouchſafe to open their rich ſilver-mines (in *Andaluſia* particularly) ſo much extolled by *Polybius*, *Livy*, *Strabo*, and others, they would do better, than make migrations into *America*. Mines at home render the labouring peaſants hardy, and are a ſort of manufactures.

I will ſay nothing of two other large civilized nations in *Europe*, which have adhered to the old military ſyſtem or antient *Gothic* trade of *conquering* and *depopulating*; or, in other words, conqueſt abroad, and depopulation both at home and abroad:—— "Now war, ſays an ingenious foreigner, makes men ſlaves, and ſlaves ceaſe to think; deſiring to excel in nothing, nor caring to labour any farther than they are compelled."

ENGLAND alone exceeds all modern nations in matters of husbandry, but to ſay *it* has made all poſſible improvements upon this occaſion, or is peopled to the full extent *it* can admit of, are aſſertions that deſerve to be queried and examined: Always ſuppoſing that the inhabitants are truly induſtrious, and that trade, manufactures, and agriculture, are ſteadily purſued, and ſtrenuouſly ſupported.

ENGLAND, as nearly as can be calculated (without including *Scotland* and *Wales*[d]) contains about thirty-four millions of acres, and maintains, at the higheſt computation (higher, I believe, than the real truth) ſix millions and an half of people. Some modern writers compute, that the preſent inhabitants amount to no more than five millions and an half.

Out of theſe thirty-four millions of acres, we will diſcount, or ſet apart, nineteen millions for foreſts, woods,

[d] *Wales* alone is thought to contain four millions two hundred thouſand acres.

woods, downs, commons, waſtes, barren lands, neglected lands, towns, high-ways, upland-paſtures, water-meadows, orchards, rivers, *&c.*

From the remaining fifteen millions of acres, we will deduct a third part for fallow-land each year, [e] and then there will be left ten millions of arable acres *de facto*.

From theſe ten millions, let us ſubtract one fourth part of the grain raiſed, for feeding and fattening cattle, *&c.* (comprehending what is deſtroyed by birds, inſects, and the like :) And another fourth part for malting, diſtilling, and ſeed-corn; and then the reſidue will be five millions of acres for making bread, or raiſing leguminous crops like field-peaſe, or cultivating field-potatoes, *&c.* which ſupply the place of bread.

Five millions of acres of wheat, barley, and rye, will, at an average of three quarters *per* acre, produce fifteen millions of quarters.

Three quarters of wheat, *&c.* will keep two perſons in bread a whole year, ſuppoſing they were to live almoſt intirely on bread : [f] Such an allowance being pretty near two pounds a day to each perſon. Nor can this proportion, which is allotted them, be looked upon as parſimonious, but rather bountiful, eſpecially if we take into the account ſickly perſons as well as healthy : And children and infants with men and women.

Therefore, as one acre of corn feeds two perſons each year, of courſe, five millions of acres will afford

[e] We are ſenſible this allowance is too great in fact, but it is what ought to be in all countries where huſbandry is rightly managed.

[f] It is not uncommon in *Barbadoes*, for an acre of yams, ſet in rows, to afford food for four men all the year round, allowing to each man four pounds a day. Perhaps the ſame might be ſaid of potatoes cultivated according to the rules of the new huſbandry.

ford ſuſtenance to ſix millions and an half of people, ſetting aſide the over-plus corn for exportation.—Not to mention that the *Engliſh* eat doubly more fleſh that any other nation of the ſame ſize.

But, if the culture of corn could be improved ſo, as that the crops in general might be rendered *one ſixth* part better than they are at preſent, of courſe we could feed more inhabitants, or enlarge the quantities ſet apart for exportation.—Or, in addition to this, if the inhabitants of a kingdom are ſober, diligent, and induſtrious in their ſeveral occupations, and ſuppoſing trade, manufactures, and agriculture thoroughly attended to, THEN *one million* more of waſte neglected acres might be incloſed, and receive the improvements of a juſt cultivation; which would augment the quantity of exported corn, or afford food to many more mouths, if the nation, by its induſtry, *&c.* ſhould have the good fortune to increaſe the number of its inhabitants. And this ſeems to be the *ne plus ultra* of our populouſneſs and plenty: At leaſt, till greater improvements may be diſcovered.

The iſland of *Barbadoes* gives us ſome notion how far populouſneſs may be carried on, and the inhabitants ſupported with food: For, though this iſland is but a ſmall matter larger than the county of *Rutland*, yet it has been known, ſince the beginning of this century, to have ſubſiſted an hundred thouſand inhabitants, when, at the ſame time, it contains but one hundred and ſix thouſand, four hundred, and ſeventy acres of land, which is little more than one acre to each perſon—But, whilſt I ſay this, I ought to acknowledge, at the ſame time, that the iſland, here ſpoken of, draws ſome ſupplies of food from the neighbouring iſlands and continent; as *London*, no longer ago than in the beginning of the laſt century, received all its fruit and garden-ſtuff from

Flanders; and *Holland*, at present, subsists chiefly on corn raised in other countries. Yet still the populousness of *Barbadoes* is surprisingly great, being, probably (if we except great cities and the district round them) as well peopled as any spot of land, of the same size, in the known world. [g] —But here let it be observed, once for all, that *great numbers* of inhabitants are the *glory* or *curse* of any country, according as the people are virtuous and diligent, or abandoned and lazy. In the latter sense,

Suis & ipsa Roma viribus ruit.

Thus have I endeavoured to make provision, either for increase of populousness, or exportation of grain. The same fields, better managed, will (as I apprehend) more than answer the first demand; but if it should be objected, that five millions of arable acres will but just suffice this our nation increased, perhaps one sixth in its number of inhabitants, and that exportation of corn must then cease;—this we deny;—for so long as free exportation is allowed, and grain bears a quick vent (being, in such a case, a species of commerce) the consequence will be, that another million of acres, above specified, will be broken up for corn, than which nothing is more feasible.

As to the *commonage* or pasture of these waste acres, the improvements, made in the culture of artificial grasses, will supply the loss, and that very abundantly, even if but one *third* part of *M. du*

[g] Permit me to observe here, in a note, that the territories of the children of *Israel*, from *Dan* to *Kadesh*, upon the northern bounds of *Arabia Petræa*, were not above 120 miles in length, and about 80 miles in breadth, from the *Mediterranean* to the eastern desart, yet, when *Joab* numbered the people, there were found to be 1,300,000 fighting men, besides women and children.

Hamel's obſervations is verified, namely, that *one* acre of lucerne, *&c.* being incloſed, and rightly managed, is equal to *twenty-four* acres of ordinary downs, heaths, and commons. [h]

Theſe, and other conſiderations of a like nature, induce me to ſpecify ſome certain *deſiderata* in *Engliſh* huſbandry: Nor may it be amiſs, at the ſame time, to mention a few ſucceſsful inventions and improvements that have been very lately made in ſeveral parts of *Europe*. For, wiſe as mankind may flatter itſelf to be, we are not abſolute maſters of phyſic, agriculture, and ſuch-like ſciences as depend on experience, obſervations, and experiments. Some things are reſerved by Providence, as incitements and rewards for human induſtry, even to the end of the world.

From many experiments of my own making, I am highly perſuaded, and in part convinced, that there is hardly a ſpot of ground, in our iſland, of any tolerable depth, (excepting mere rocks, quagmires undrained, or land filled with ſome arſenical, or other poiſonous matter) but may be managed ſo, as to anſwer ſome uſeful purpoſes of huſbandry; being capable to be raiſed from one ſhilling an acre, clear profit, to ten ſhillings at leaſt, and, in many inſtances, to a far greater proportion. Nature, with a ſmall variation of more or leſs, has been almoſt equally bountiful to all her *induſtrious* children in all places. I lay ſome ſtreſs on the word *induſtrious*, becauſe it is evident, that the richeſt ſoils in themſelves, if the cultivator is indolent and unattentive, do not always produce the largeſt and beſt crops. In this ſenſe let us compare *England* and *Sweden* with *Italy* and *Louiſiana*, and we ſhall ſoon find that the ſcale preponderates, in favour of art and labour. Nature, ever generous and beneficent, has given

[h] Essay II, *Sect.* ii.

given (to a certain degree) all neceſſary things to all places: Or, at leaſt, has ſubſtituted a poſſibility of raiſing equivalent things for *thoſe* that may be wanted by men or cattle. Thus wheat, grain, and graſſes of moſt kinds, may be called, more or leſs, *univerſal growers*, provided they are cultivated with diligence and ſkill; and though Providence has made no proviſion for *want of induſtry*, yet it has had a tender regard for that ſort of ignorance which ariſes from the circumſtances of things: And therefore (to inſtance only in one example out of a thouſand) where wheat does not grow naturally, or has not been raiſed by human induſtry, there are to be found ſufficient ſuccedaneums to make amends for its abſence; as maize, rice, panic-graſs ſeeds, and the roots of the caſſava.—Yet, even here, art and induſtry make a new creation: For wheat has been found, by experience, to proſper no where better than in *Chili* and *North America*.

But to dwell ſomething longer on a notion that may appear, in the eyes of many readers, to be of a particular caſt.

The ſupreme Being, in conſequence of the malediction upon the earth, pronounced at the fall, ſeems to have appointed *induſtry* (in itſelf a virtue) as the only human means of alleviating the weight of ſuch malediction. This being granted (and ſome traces of the doctrine appear, in many writers on huſbandry, who were not Chriſtians, as *Heſiod*, *Virgil*, *Columella*, and others) it ſeems to me, that all meliorations and improvements, in the culture of the earth, are divine rewards, propoſed, and reſerved for man, as the retribution of his diligence. And if diligence is to be encouraged every-where (God's puniſhments for remiſſneſs and rewards for induſtry being univerſal) it is certain that every ſoil is capable of being improved by human application, and made

made to anſwer ſome œconomical purpoſe, with regard to the well-being of mankind. It is therefore I have aſſerted, that almoſt all earths (excepting thoſe above excepted, and they have their collateral uſes too) may, in an husbandry-ſenſe, repay the cultivator for his labour and charges. For, let a tract of ground be of what quality or mixture ſoever the moſt unbounded imagination can figure to itſelf, there is *one*, or there are many *uſeful* productions *congenial* to that very particular ſpot, and which would fail of ſucceeding *equally* in what we commonly call better ground.

Here the *deſideratum* in agriculture is to compoſe a liſt of ſuch ſoils as conſiſt chiefly of one predominant ſubſtance, and of others again, that are made up of various mixtures (thoſe mixtures being accurately ſpecified :) Regard muſt be likewiſe had to mountains, uplands, vallies, and moraſſes, heat, cold, aſpects, lightneſs, and ſtiffneſs of earth, *&c.* *&c.* and then the *profitable* crops (for ſuch may always be found) *peculiar* to theſe very places are to be enumerated, together with rules for culture and the relative application of manures. Theſe are diſcoveries in husbandry worthy of another *Verulam*; for it is no matter *what* crops we raiſe, provided they are *vendible* and *profitable*.

Nor is it improbable, but, if theſe eſſays ſhould have the good fortune to fall into the hands of *Linnæus*, or ſome of his diſciples, that the undertaking may be completed one time or other, however extenſive and tedious the manifold experiments may appear to be. It is true, neither a *Frenchman*, nor an *Engliſhman*, can ſubmit to employ ten or fifteen years in compoſing an hundred pages; yet, perhaps, a *Swede*, or a *German*, may be endued with proper patience and fortitude And thus much I dare venture to pronounce, that ſuch a work, faithfully

fully and judiciously executed, will survive (and that with reputation) an infinite number of modern folios.

Our fellow-creatures may possibly arrive to higher perfection, one time or other, in the *culture of wheat*, notwithstanding it has been the constant employment of mankind ever since the world began: For, at present, a return of *seven* for *one* makes the common produce at an average throughout all *England*:[n] Nor is any *European* nation, upon the whole, more successful than ours in this point. Yet the two *Ulloas* (*Spanish* authors of great credit) assure us, that wheat in *Chili* often produces a crop of one hundred fold: [o] So that probably the soil proves better than ours, or greater space is allowed the plants. But then the misfortune is, that the husbandman in *Chili* has no vent, except amongst his few neighbours, and no exportation for the grain thus raised; which of course, reduces it to so low a price, that three *arrobas*, or one bushel and one gallon of wheat, *English* measure, are usually sold for two shillings nine pence three farthings, and sometimes for two shillings and three-pence.

We are not, perhaps, as yet sufficiently instructed in the œconomy that may be used as to the *quantity of seeds* that ought to be sown, or the right manner of keeping plants clean, and allowing them space.

[n] Since writing this passage, I am more confirmed in my opinion, from the produce of a crop of wheat raised, last year, by that excellent husbandman, *Bellingham Boyle*, Esq; of *Rathfarnam*, near *Dublin*, who, from 16 lbs, or near a peck of seeds sown, reaped about 50 bushels of grain; which crop may be computed to have made a return of near *two hundred* pecks for *one*; on which account the first premium was adjudged to him, by the *Dublin* society, *Nov.* 18, 1763.

It is natural to imagine, that this was performed upon the principles of the New Husbandry.

[o] *Voyages to South America*, vol. II. p. 245.

ſpace.[1] We are guilty, probably, of omiſſion or remiſſneſs, in not repeating ploughings, harrowings, and horſe and hand hoeings; as alſo in the make and conſtruction of husbandry-inſtruments; and the right preparation and application of manures.—We have done much, but not all that can be done, nor even the beſt that can be done in cultivating *new ſorts of herbage for the ſupport of cattle:* Nor are we curious enough to know, or diligent enough to deſtroy not only ſuch *weeds* as are troubleſome to the husbandman, but ſuch as are always hurtful, and many times fatal to grazing animals. ——Nor have we ever given due, or, perhaps, common attention to the *nature of each ſort of water* which thoſe creatures drink. This is an article of the higheſt importance, and falls under the chapters of *deſiderata*, which *Columella* mentions, with regard to himſelf and other lineal ſucceſſors of *Virgil:*

> Nempe ea quæ quondam *ſpatiis excluſus iniquis*,
> (Cum caneret lætas ſegetes, & munera Bacchi,
> Et te, magna Pales, nec non cœleſtia mella)
> Virgilius nobis *poſt ſe memoranda reliquit.* [m]
>
> *De Cult. Hort.* l. x.

Perhaps we have not been ſufficiently inquiſitive and diligent in importing and introducing amongſt us *new ſorts of corn*, and particularly *that* kind of wheat which may be ſown in ſpring: Which neceſſary

[1] See more on this ſubject in the next Essay, with an *experiment* for knowing the full extenſion of the roots of plants.

[m] Columella *De Cultu Hortorum*; *Rei Ruſt.* l. x.

The paſſage in *Virgil*, here alluded to, may be ſeen in the 147th and 148th verſes of the *fourth Georgic:*

> *Verum hæc ipſe equidem ſpatiis excluſus iniquis*
> *Prætereo, atque aliis poſt me memoranda relinquo.*

sary *succedaneum* ought much to be sought for, when the latter end of autumn, or the winter ensuing, prove unfavourable to common wheat: Or, when we had not the power, by reason of some particular hindrances or difficulties, to sow it in *September* or *October*. —— Now there is a *wheat*, cultivated in *Dauphiné*, *Languedoc*, *Flanders*, and near *Seville* in *Spain*, which may safely be sown in spring: That being, indeed, the proper time. I had once two bushels of this *Spanish* sort, sent me by my ingenious and worthy friend, *Philip Stanhope*, Esq; at present, his majesty's *Envoy Extraordinary* to the diet of *Ratisbon* and the circles of the *Rhine*; but not knowing *then* that it was a spring-corn (and, by the way, *M. du Hamel* fell formerly into the same mistake) I ventured it into the ground soon after *Michaelmas*, with other wheat from *Germany* and *Courland*; and, even then, about one third of the *Spanish* seeds survived the winter (which proved a mild one) and produced the best corn for bread I ever tasted. —Such corn must be sown in *England*, about the middle of *February*: [p] For it is a vernal, or spring-wheat.

Syrian wheat succeeds very well in *Germany*, and the *Swedes* have cultivated, with good success, several sorts of *buck-wheat* that were brought from *Siberia*.

If *maize* can be raised amongst us, on terms moderately easy, [q] it well deserves our attention, being an wholesome grain, and of so nourishing a nature, that an *Indian* savage can carry as much on his back, as will support him during an expedition of six weeks con-

[p] This is not the species of *Spanish* wheat taken notice of, p. 83.

[q] In the years 1760 and 1761, very good *Indian* corn was raised in the field by —— *Debany*, Esq; at *Hungerford*-Park in *Berkshire*.

continuance: You may ſee vaſt fields of it on the banks of the *Rhine*, even in tracts of land where common wheat is cultivated with difficulty: And, in *Piémont*, the inhabitants live chiefly on it; nor does any food anſwer better in feeding and fattening cattle.

Maize, in England, may be managed after another faſhion. The grains muſt be ſown thick, and under furrow (in ſuch manner as field-peaſe are ſometimes ſown) in light warm ground, thoroughly ploughed, manured, and made fine; and, tho' ſuch plants cannot be expected to produce corn, yet they may be mown when 2 feet high, and given green to cattle, or made into hay. Either way they afford excellent forage.

There is another point of great conſequence, tho' perhaps, it be unknown at preſent, which deſerves well to be conſidered by my ingenious countrymen: *There are many uſeful ſucculent annual plants, that draw their nouriſhment more from the air and influences of the atmoſphere than from the earth*; and theſe ſeem to be intended by Providence for the advantage of poor ſhallow lands, either as a crop, or a manure, to be ploughed in.—Some farther verifications of this fact will be of great importance to agriculture.

The firſt hint of this improvement was ſuggeſted long ago to mankind by *Xenophon* [r] and *Varro*.

[r] The original paſſage, in *Xenophon*, is as follows:

"What I think," ſays *Iſchomachus*, "highly neceſſary to acquaint you with, is, that, in ſuch a caſe, you ought to ſow your crop when the ground is moiſt, and when it receives moſt benefit from the influences of the atmoſphere: And *then*" (that is, when the herbage is come to its due ſize, and before it begins to form its ſeeds) "you are to turn it under furrow with the plough, which will greatly enrich the ſoil, and give it as much ſtrength as a good ſtercoration would do."

Oeconomic.

ro. [a] So true it is, that there are but *few things new under the sun.* Two years past, a *German* nobleman revived this idea, after it had lain dormant for such a number of centuries; or, to do him justice, perhaps, struck upon it in the same original manner that *Xenophon* and *Varro* might do. Either way, great honour is due to a person of quality, who loves, knows, and studies agriculture in the midst of a court.

Nor have we imported half so many sorts of *leguminous plants* from *Asia*, and the districts round *Constantinople* in particular, as doubtless we might have done; nay, what hitherto has been introduced and cultivated, seems chiefly calculated to augment the luxury of great mens tables, instead of relieving the wants of the poor, or procuring a variety of wholesome food for cattle.

The *Swedes*, to their honour be it spoken, have taken most pains under this article.

As to the *algarobale* of *South America*, one species of which is cultivated in *Spain*, and called *Valencia*: As also the *Calevanche-pea* (or bean rather) of *Canada*, *Mary-land*, *&c.* they may be considered more at large by writers who shall hereafter treat of new and wholesome food for cattle. I have raised the *calevanches* in an *English* field, but as the seeds were old and damaged (for a little insect attacks the germinating eye of the bean in about the space of a year or sooner) I drew no very favourable consequence from my attempt: Nevertheless, some of the few plants that came to maturity, sowed themselves, and

[a] *Varro* is still more explicit: ——Rectius enim in *tenuiore terra*, ea seruntur quæ non *multo indigent succo*, ut *cytysus* & *legumina*.——Quædam etiam serenda, non tam propter præsentem fructum, quam in annum prospicientem: Quod ibi subsecta atque relicta terram faciunt meliorem. *Itaque lupinum, cum nedum siliculam cepit, si ager macrior est*, pro stercore inarare solet. L. i. c. 21. p. 60. b.

and ſurvived the winter. Fame ſays, that the *calevanche* is originally an *European* plant; if if be, it is a ſort of lentil.

It is remarkable, that, next to the care of horſes, we have been more curious in the breed of dogs, than in that of *kine*, *ſheep*, *ſwine*, and *goats*: Which are animals of much greater uſe to ſociety. As to buffaloes, uſed in ploughing, where oxen are neceſſary, and the *Spaniſh* race of ſheep, in order to obtain good wool, we may, one time or other, ſpeak more diſtinctly; nor ought the preſent *Swediſh* breed of ſheep to be neglected, whoſe fleeces are equal in fineneſs to thoſe of *England*, and the variety likewiſe of the breed may help a little.

There are *cows* likewiſe, in various parts of the *Indies*, that give a larger quantity of milk than ours, yet live harder, and content themſelves with more penurious diet. And why may they not thrive as well with us as *Chineſe* hogs, which are to be ſeen, at preſent, in almoſt every farm-yard in *England*, and, when mixt with our own breed, are preferred, even by country-people, to any other ſort of ſwine: Not only becauſe their fleſh is better taſted, but becauſe they require leſs corn to fatten them?

The *goats* of *Angora* [t] and *Tripoli* [u] (whoſe hair can-

[t] *Angora*, one of the chief cities in *Anatolia*, is famous for its fine remains of antique buildings, as alſo for a breed of *ſheep* and *goats*, whoſe wool and hair are not to be equalled, according to *Strabo*'s account.——As to the *goats* in particular, *M. de Tournefort* tells us, that their hair is 8 or 9 inches long, finely curled, and of a dazzling whiteneſs. Many rich ſtuffs are made with it, but chiefly cambiets. The common price of it, after the natives have ſpun it (by which they gain their ſubſiſtance) is not dear, if it be purchaſed on the ſpot: But an *oke* (or 25 lbs. weight) of the very prime ſort, for the uſes of the grand Signior and the Seraglio, often ſells for 5*l. ſterling*.

A print of the *Angora-goat* may be ſeen in *Tournefort*'s *Voyages*, tom. III. p. 334.

[u] This was the *Cyniphian* breed, ſo much extolled by the antients: *Nec*

cannot be equalled in manufactures for camblets, *&c.)* have been made denizens of *Sweden*, and the *camel*, some years ago, became familiarized to the climate of *Saxony*. Nor ought the honest laborious *ass* to be forgotten, in order to propagate a larger sort of *mules:* Especially in such parts of our kingdom as are stony and mountainous, and where few roads have been improved by erecting turnpikes.

It is certain, that a mule will struggle through the drudgery of hard service, better than a horse: He is also longer-lived, and kept at half the expence.

Every traveller that has made the tour of *Italy*, may remember, that all the stones, employed in building the duke of *Tuscany*'s magnificent palace [a] at *Florence*, were brought from the quarry (which, indeed, lay where the garden is now) by one mule: And, by way of preserving the memory of this useful drudge, there is a figure of it, in metzo-relievo, on one of the walls of the gate-way.

There is a farther use for mules in our country. It is a matter of some surprize to me, that, when mechanic artists have been encouraged to make chairs and sofas in such a manner as to promote not only ease, but a sort of luxuriousness in ease, no one person of fashion, in cases of extreme weakness, nephritic disorders, *&c.* has had courage enough to introduce the *Italian* practice of travelling in a sedan chair or litter, carried upon shafts by two mules, and conducted by a muletier on foot; no

Nec minus interea barbas incanaque menta
Cyniphii tondent hirci, setasque comantes.
VIRG. *Georg.* III. *v.* 311.

Non hos lana dedit, sed olentis barba mariti:
Cyniphio poterit planta latere sinu.
Mart. l. xiv. E. 94.

[a] Palazzo Pitti.

ſort of land-conveyance being ſo cheap, ſafe, and ſteady;—ſo capable of being continued day after day;—and (all things conſidered) ſo expeditious. For the mule-driver, and his cattle, will travel, with pleaſure, 40 miles a day, for a week together, in mountainous rocky roads.

Would not this be a more compendious and natural conveyance than to poſt our fellow-creatures in relays, at various ſtations, in order to carry a ſick perſon, perhaps, one hundred miles or more, in a ſedan-chair; or conſtruct a ſort of cumberous hoſpital or lazar-houſe upon wheels, tottering in the air, and liable to be overturned (with no ſmall danger) every hour; when a couple of mules and a muletier would diſpatch the ſame buſineſs with eaſe to themſelves, and ſatisfaction to the ſick or infirm perſon thus conveyed?

A friend of mine propoſed, ſome years ago, to ſend from *Spain* to *Ireland* a couple of aſſes 15 hands high, which, it was computed, would coſt him one hundred piſtoles each. Not to mention the difficulty of conveying them thence, againſt the laws of the country. Nor did the gentleman here mentioned, who has few equals in ſolid or polite literature, look upon this ſlight circumſtance, relating to rural œconomics, to be in any degree beneath his attention. [b]

It is ſome ſmall neglect alſo in public management, that *corn* is allowed to be ſold by *meaſure*, rather than *weight*: Since it would be very eaſy to ſtate the juſt weight of what is now called a buſhel of good corn. A public ordinance of this kind would have excellent effects: The purchaſer would not be defrauded of his due proportion in flour, and the huſbandman would find it his intereſt to plough,

[b] The perſon here meant, is *Joſeph Henry*, Eſq; of *Straffan*, near *Dublin*.

plough, fallow, and weed effectually: To procure freſh ſeed from a conſiderable diſtance, and raiſe the fulleſt, largeſt, ſmootheſt, and heavieſt grain. I have obſerved, numberleſs times, in wheat, ſold by *meaſure*, a difference of ten pence in five ſhillings a buſhel, between plump, ſound, clear-rinded corn; and that which was ſhrivelled, diminutive, parched, and huſky: *Such*, in a word, as is uſually gathered from lands of moderate fertility, that have received neither reſt, nor proper manures; being ploughed ſuperficially, and ſown too late in the year; being alſo the produce of ſeed raiſed by the huſbandman on his own lands, or purchaſed too near home.—This ſhews the great expediency of bringing *Spaniſh* and *Sicilian* wheat into vogue, for a buſhel of good *Spaniſh* wheat uſually weighs *ten* pounds more than a buſhel of good *Engliſh* wheat: The difference being as 73 to 63.[c]

Our nation has complained, uniformly, for two centuries paſt, of the ſcarcity of *timber and fire-wood*, yet neither the public nor individuals have done much towards alleviating theſe juſt apprehenſions. It is true, our nobility and gentry, of late years, have ſhewn unwearied diligence and ſkill in cultivating trees of foreign growth, but, in moſt attempts of this kind, the *ornamental* has taken place inſtead of the *uſeful*. Nevertheleſs we need not be afraid of exerting our beſt endeavours in the *latter* inſtance: for there are many trees, both advantageous and profitable, which remain ſtill to be removed from their native countries, and familiarized to our climate:

Cælum, non animum mutant, ſi trans mare currant.

[c] See more in *Hartlib's Legacy*, p. 15. 4°. 1651, and in *Moleſworth's Conſiderations of improving Agriculture.*

But without repeating the complaints of many of my ſenſible countrymen upon this ſubject; and notwithſtanding that national evils rarely happen ſo ſoon, as mens fears predict they will happen; yet certain it is, that ſome public care ſhould be taken for encouraging the raiſing of timber-trees and wood for fewel. We are now almoſt arrived to that univerſal maſſacre of woods and foreſts, which an antient poet deſcribes:

Nuſquam umbræ veteres. Minor Othrys, & ardua ſidunt
Tayïgeta; exuti viderunt aëra montes.
Jam natat omne nemus. Cæduntur robora claſſi—
——————Ipſum jam puppibus æquor
Deficit, & totos conſumunt carbaſa ventos.
STAT. *Achill.* I. v. 426.

The *cloud-capp'd* foreſts, by old bards renown'd,
Now only wave upon poetic ground:
Tayigetus contracts her ſylvan ſhades,
And *Othrys* has her day-light and her glades;
The alpine larches ruſh into the main,
And ſport exulting on the liquid plain:
Old *Ocean* groans beneath th' unuſual weight;
Nor have the heav'ns a wind for ev'ry freight.

In the year 1750, a repreſentation was made to the *French* king, requeſting him that he would cauſe to be planted a large part of the foreſt of *Rouvray*, which yielded one production that was uſeful. Of courſe, by way of commencement, three thouſand waſte acres were ſet apart for this purpoſe, and planted with birch-trees and reſiniferous pines, where the birches failed: For the ground was remarkably dry, ſandy, and barren. In ſuch a ſoil (if lands ſo circumſtanced deſerve the name of a ſoil) it has been obſerved, that the pines abovementioned will grow, even

even though the earth be incapable of bearing any other tree. Nor ſhould one be afraid to venture the larch (one of the moſt uſeful trees) to take its fortune in ſuch-like barren tracts, which otherwiſe may be called a ſort of rent-charge on the community, being like the land of the *Cyclops*, mentioned by the ancient claſſic poets.

Waſte foreſts in *England* appertaining to the crown, and waſte tracts belonging to individuals, might be peopled with reſinous trees at no great expence; and would ſupply the neighbourhood with hop-poles, ſpars for gates, laths, rafters, timber for building, and other carpenters work. Nay, maſts might be taken from ſuch plantations for ſmall ſhips.

Theſe trees, after 20 years growth, will be capable of yielding reſin, and continue to do ſo for the ſpace of 20 years longer. From this reſin is produced the oil of turpentine; and poor people, in alpine countries, make candles with it. An induſtrious peaſant may extract in a year, from four or five thouſand trees, one hundred, and ſometimes one hundred and twenty-quintals of reſin.

When the 20 years for producing reſin are expired, ſuch trees as have been bored (for the timber of them is of no value) are condemned to the fire; and thus the pitch and tar are extracted, and from them the mariner works up his oakum: The waſte wood may alſo be charked; and ſuch charcoal (amongſt other uſes) will be particularly ſerviceable to ſmiths: For it takes off the ſharpneſs of the coal-forge, and makes the iron more ductile and manageable in the hands of a curious workman.

The ſeeds of theſe reſiniferous pines may be procured from abroad, *at beſt hand*, for about three pence a pound, with ſome abatement, if purchaſed, by the buſhel or quintal. They muſt be procured and brought over in ſuch manner as we ſhall give advice concerning larch-ſeeds.

In a commercial kingdom like ours, enriched by ſuch an extenſive navigation, it behoves the government to take care, by the means of rewards and penalties, that freſh ſucceſſions of timber may be raiſed for the ſake of poſterity. For we much want what the *Roman* poet deſcribes,

Sylva frequens trabibus, quam nulla ecciderat ætas.

Relative to this purpoſe, there is a paſſage in *Xenophon*, that well deſerves to be taken notice of: "If the *Athenians*," ſays he, "had inhabited an iſland, and, in addition to this, had enjoyed the empire of the ſea, they would have been able, as long as they poſſeſſed ſuch advantages, to have annoyed others, without being reciprocally annoyed by them." [d] We leave the reader to judge how far this prophecy may be verified, in regard to *England*.

We will now return to the culture of uſeful trees.

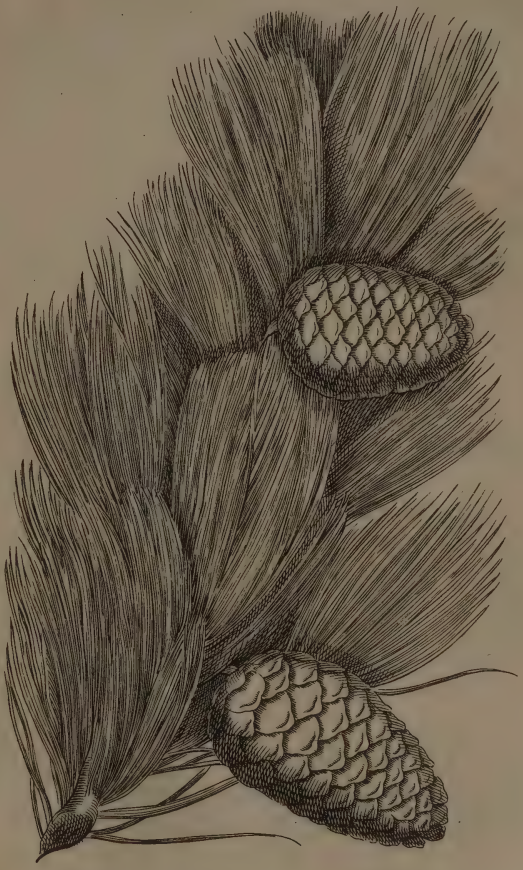
The *aphernouſli*, or *arkennouſli* of *Switzerland*, *Trent*, *Carniola*, &c. might probably thrive to great advantage in our bleak, barren, rocky, mountainous tracts of land: Even near the ſea, [e] and in north or north-eaſterly aſpects, where ſomething of this

[d] *Xenophon.* De Republ. Athen.

[e] If the *arkennouſli* will not thrive near the ſea, there is, in particular, a *maritime* pine on the coaſts of *Tuſcany* near *Piſa*, and in many parts on the ſea-coaſts of *France*, *Spain*, and along the ſhores of the *Adriatic*, which well deſerves to be propagated where plantations of them are wanted on the ſea-coaſt, or when other plantations *there* ſtand in need of being guarded and protected from ſharp air and boiſterous winds.

The timber of this tree has many uſes. The tree itſelf affords its ſhare of reſin, and grows to a conſiderable ſize. There are three known ſorts in *Europe*—Fine prints of them, cut on wood, may be ſeen in *Matthioli's Commentary on Dioſcorides*, l. i. c. 74. and in *Du Hamel's Traité des Arbes & Arbuſtes qui ſe cultivent en pleine terre*, 4°. tom. II. pl. 28. &c. á Par. 1755.

A Branch of the APHERNOUSLI-TREE.



Th. Richéli delin. W. Hibbart sculp.

this kind is much wanted. It is a ſpecies of pine or pinaſter which grows on alps, and in alpine countries, where one would think it impoſſible that any tree could vegetate and proſper. The timber is large, and has many uſes, eſpecially within doors, or under cover. The branches reſemble thoſe of the pitch-tree, commonly called *ſpruce* fir: [f] But the cones are more round in the middle, being of a purpliſh colour ſhaded with black. The bark of the trunk or bole of the tree is not reddiſh like the bark of a pine, but of a whitiſh caſt, like that of the fir. The huſk, or ſort of ſhell, which incloſes the kernels, is eaſily cracked, and the kernels are covered with a brown ſkin which peels off: They are about as large as a common pea, triangular like buck-wheat, and white and ſoft as a blanched almond, of an oily agreeable taſte, but leaving in the mouth *that* ſmall degree of aſperity, which is peculiar to wild fruits, and not unpleaſing. Theſe kernels make a part ſometimes in a *Swiſs*-deſſert:——They ſupply the place of muſhroom-buttons in ragouts:—And are recommended alſo in conſumptive caſes on account of their balſamic oil.—Wainſcoting, flooring, and other joiners work made with the planks of *aphernouſli*, are of a finer grain, and more beautifully variegated than deal, and the ſmell of the wood is more agreeable. From this tree is extracted a white, odoriferous reſin. [g]

The *aphernouſli* is of an healthy vigorous nature, and will bear removing when it is young, even in dry warm weather. The wood makes excellent fir-

[f] This tree is not called *ſpruce* from the *German* word, which ſignifies *Pruſſian*, but becauſe the *French* in *Canada* gave it the name of *la Peruſſe*.—The leaves of it are put into beer.

[g] The curious reader may conſult, on this and the like occaſions, a very ſcarce piece, *De Arboribus Coniferis*, written about 200 years ago, by *Pietro Belloni*, or rather *Belon*; for I am inclined to think he was a *Frenchman*.

ing in ſtoves, ovens, and kilns, but is dangerous to be uſed on the hearth or in grates, being apt to ſplinter and fly to a conſiderable diſtance.

That I may be as diſtinct as lies in my power, with relation to this valuable *European* tree, [h] (at preſent, little known to my ingenious countrymen, and not to be found in ſome of the beſt books on planting and gardening) it may be juſt worth while to obſerve, that it is the *pinus Cembra* of *Matthioli* and *Linnæus*, the *pinus foliis quinis* in *Haller*, the *larix ſemper-virens* in the *German Ephemeris*, the *libanus Carpathius* of ſome writers, and the *pin a cinque feüeilles*, N°. 20. in *Du Hamel*.—The common people in, and near *Italy*, ſometimes call it *cirmoli*.

A poetical writer, in the laſt century, who was paſſionately fond of agriculture, appears to have painted a foreſt of mountain *aphernouſli*'s with as much juſtice and ſublimity, as if he had ſketched out the deſcription at the feet of the *Swiſs-Alps* : [i]

Sublimi feriunt rorantes vertice nubes.——
——Quantum deſpiciunt montana cacumina valles,
Tantum ILLÆ *ſtantes in ſummo, montibus ipſis*
Altius aſſurgunt ; ſic ſtabat turba gigantum,
Sic ſuperinjectâ frondoſo Pelio Oſſâ
Stabant terrores ſuperûm. [k]

——On foreſts, foreſts riſe,
Till the top branches touch the dewy ſkies.—

As

[h] There is a moſt beautiful print of the *aphernouſli*, cut on wood, in *Du Hamel*'s *Traité des Arbres & Arbuſtes, &c.* tom. II. pl. xxxii.

[i] The poets were always ſtruck with this beautiful part of an alpine landſcape. *Homer* paints it in one word, εἰνοσιφυλλὸς. *Illiad. α.*—*Caput piniferum Atlantis.* VIRG. *Æn.* 4. 249. *Rupes piniferæ.* LUCAN. 2. 431. *Piniger Othrys.* VALER. FLAC. 6. 393. *Nutant mutata cacumina montes.* STAT. THEB. 6.

[k] COULEIUS *de Plantis*, l. vi.

As *Alpine* cliffs o'erſhade the vales below,
So *theſe* hang nodding o'er th' aerial brow
Of *Alps*.—Earth's giants thus provok'd the fight,
[While *Pelion* groan'd o'er-pil'd with *Oſſa*'s height]
A terror to the gods!

Since writing thus far, I learn from good authority, that the *aphernouſli* grows in great abundance on the moſt mountainous and coldeſt parts of the *Briançonnois*, where it is called, by the natives, *alviez*. It bears ſome reſemblance to the white *Canada*-pine, which is better known in *England* by the name of *Weymouth*-pine.

The *horſe-cheſnut* is originally a native of *Great Tartary*. The *cedar*, with many uſeful *Siberian trees*, [and here let me no-ways forget, for the ſake of cattle eſpecially, ſome ſpecimens of *cytiſus*, the growth of *Siberia*, which were lately ſent to me] have not diſliked their removal into *Germany*; and, probably, out of fifty ſorts of trees, which *Kalm* and others have tranſported lately from *North America* into *Sweden*, ſome may prove of great conveniency to human kind, and, in all probability, will ſoon grow reconciled to our earth, air, and ſunſhine. For *Du Hamel* juſtly obſerves, "that moſt trees which proſper in one country, will thrive in another country of the ſame latitude." Nor ought we, in *England*, to neglect attempting to cultivate the *acorn-cheſnut* of *North-America*: Which has the leaves of a common cheſnut-tree, but the fruit reſembles an acorn in ſhape, as does alſo the cup that holds it. It has the taſte of a good cheſnut; ſo that (if there were not certain objections to the contrary) one might almoſt pronounce it to be the *true poetical acorn*, which fed mankind in the age of ſimplicity.

If one of the beſt proclamations *James* I. ever publiſhed, relating to *mulberry-trees* and *breeding-ſilk-*

ſilk-worms, [n] had taken any effect on mens minds, it is probable, we might have eſtabliſhed ſome manufactures of *Engliſh* ſilk, at leaſt a century ago.—And as there was always a difficulty, both here and in *Switzerland*, in bringing the mulberry-trees to bear leaves ſoon enough in the year for feeding ſilk-worms (ſince otherwiſe the young ones might be hatched, without having food prepared for them) of courſe, if the late diſcovery of an ingenious *Swede* be faithfully related in a treatiſe, intitled *Rural Oeconomy*, [o] this defect may be alleviated, by cutting the branches cloſe, and pruning the mulberry-trees in the manner of ſhrubs, by which means the leaves will be produced a fortnight ſooner, and the young ſhoots will be more tender and nouriſhing than thoſe that are older. It is probable, the mulberry-trees, ſo much taken notice of, lately in our accounts from *Holſtein*, *Denmark*, and *Sweden*, are cultivated according to this method. But I am aſſured the *Chineſe* take a better courſe: They ſow or drill mulberry-ſeeds as we do pot-herbs, and cut the young green herbage at one year's growth for the ſilk-worms when they are newly hatched; which proves a tender ſucculent food, and frees them from the diſeaſes which old harſh leaves are apt to occaſion.—Mulberry-trees grow wild in *South Carolina*, as alſo in ſome parts of *Canada*, and probably might be cultivated with little expence and labour, to ſuch a degree, as to ſupply the *Engliſh* manufacturer with a conſiderable quantity of unwrought ſilk.

Things *ſeemingly* trifling and inconſiderable ought, by no means, to be neglected in *Rural Oeconomics*. [p]

—Our

[n] It is preſerved by HARTLIB in his *Legacy*.

[o] Abridged in *French*, and publiſhed at *Zurich*, 1761, 8°.

[p] This ſhall be exemplified by an inſtance that appears to be trivial.—"Moſt of our notable houſe-wives," ſays the *Swediſh* author

—Our anceſtors condeſcended to turn their thoughts to the management of *bees*; and the author of the *Æneid* made it the favourite as well as finiſhing part of his immortal *Georgics*.—There have been more books publiſhed formerly in *England*, on *bees and apiaries*, than upon any ſingle ſubject in huſbandry. —Sugar, it is true, with the boldneſs of an empiric firſt diſcredited, and then promiſed an alternative by way of ſupplying thoſe ſtreams of honey which flowed naturally through our *Canaan*. The enchantreſs prevailed with the uſual art of foreigners, and thus we ſacrificed our health and ſimplicity for elegance and luxury.

Every cottager, however poor, may provide himſelf with *bees*, and neither nature, art, nor laws, have preſcribed any bounds to theſe innocent wanderers, whom

author abovementioned, "have long deſpaired of ſucceſs in rearing turkeys, and complained that the profit rarely indemnifies them for their trouble and loſs of time. Whereas little more is to be done (continues he) than to plunge the chick into a veſſel of cold water the hour, or, if that may not be, the day it is hatched; forcing it to ſwallow one whole pepper-corn, and then reſtoring it to the mother. From that time it will become hardy, and fear the cold no more than a hen's chick.—After which, it muſt be remembered, that theſe uſeful creatures are ſubject to one particular malady whilſt they are young, which carries them off in a few days. When they begin to droop, examine carefully the feathers on their rump, and you will find two or three, whoſe quill-part is filled with blood. Upon drawing theſe the chick recovers, and thenceforwards requires no other care than what is commonly beſtowed on poultry that range the court-yard.

"Theſe articles are too true to be denied: And, in proof of the ſucceſs, three pariſhes in *Sweden*, for many years, have annually gained ſome hundred pounds for rearing and vending turkeys." *Rural Oeconomy*, p. 739.

[Our countryman, *Markham*, knew this diſtemper in the year 1631, and adviſes likewiſe, after the feathers are plucked, to examine if there be not a little core in the fleſh beneath, and, if there be, to ſqueeze it out, and rub the wound with an infuſion of ſalt in water.]

whom all mankind conſiders, in the light of coſmopolites. [m] They have a tacit right to ſeek their food wherever they pleaſe, and will thrive and multiply, not only in cultivated places, ſuch as plains and meadows, but even in foreſts and deſarts. An aged man or woman, unable to perform an hard day's work, may take care of an hundred hives: And, laſt year, a perſon in *Sweden*, who ke s bees only for amuſement, ſold their honey and wax for 50 *l. ſterling*.

A particular friend of mine, a learned dignitary in the church, who has amuſed himſelf at leiſure hours with the management of bees, has obſerved to me, that the main objections which country-people have to the nurturing of bees, are, the expences of feeding them in winter, and the caſualties of ſickneſs, *&c.* to which theſe delicate creatures are liable in that ſeaſon.—In order to obviate both which objections in part, or in the whole, he obſerves as follows: Namely, that moſt perſons uſually chuſe a wrong ſituation and aſpect for placing their hives; making it their choice, as much as poſſible, to fix them ſo, as to front the noon-day ſun. Now the gleams of ſun-ſhine in winter, eſpecially in clear freezing weather, waken the bees in their natural torpid ſtate, and tempt them to make excurſions till the froſt benumbs them. In ſuch weather I have ſeen bees ſunning themſelves upon the ſnow till they have loſt their lives; for the return of a caſual and deceitful warmth tempts them to make little excurſions. For theſe reaſons, the gentleman abovementioned recommends a well-guard-

[m] Solæ apes in omni genere animantium communem omnibus ſobolem habent, unam omnes incolunt manſionem, unius patriæ clauduntur limine, in commune omnibus labor, communis cibus, communis operatio, communis uſus & fructus eſt.

Ariſtot. *Hiſt. Anim.* l. ix. c. 40.

guarded ſituation as to the north and eaſt, but, at the ſame time, adviſes, that the mouth of the hive ſhould rather front the eaſt, than the ſun at noon-day; for, in ſuch a caſe, the bees would not be tempted, in bright winter-days, to range abroad, nor be wakened ſo often out of their doſing ſtate; and, ſuch being the caſe, they would, of courſe, require leſs food. This being premiſed, it may be obſerved farther, and that for the ſake of the poor, that an induſtrious day-labourer, and his wife, if they live in a cultivated country well ſtocked with trees, may clear five or ſix pounds yearly by keeping bees, and that without loſing more than a ſingle hour now and then from their neceſſary employments, except once a year at ſwarming-time.

Bees may be multiplied to what number we pleaſe, if care be taken to ſupply them with a good quantity of vegetable food near home. It is well known theſe induſtrious inſects will travel a great way for the ſake of completing their day's work: So that I have known them make a tour of two miles a turn, twice or thrice in a day, in order to lade themſelves with the rich plunder of a field of buck-wheat, till at length they have almoſt ſunk beneath their burthen, not being able to get into the mouth of the hive. What they want, in clearneſs of eye-ſight, is made up by a moſt exquiſite ſenſe of ſmelling, which *Lucretius* long ago took notice of:

——*Ideoque per auras*
Mellis apes, quamvis longe, ducuntur odore.
Lib. iv. v. 683.

Virgil, in recording the ſkill and induſtry of the old *Corycian*, mentions particularly his management of bees:

Ergo

Ergo apibus fœtis idem atque examine multo
Primus abundare, & ſpumantia cogere preſſis
Mella favis.——

Next to buck-wheat, bees are very fond of alder-buds for 6 months of the year, and one dark-coloured part of the bloom of vetches and other leguminous plants; as alſo maple-flowers, dandelion, thyme, honey-dew'd oaks, heath, white garden-poppies, turnip and rape flowers: But particularly the flowers of viper's bugloſs, which beautiful and ſingular plant [r] thoſe who have a large apiary ſhould cultivate on purpoſe. Nay, bees will extract ſweets from vegetables that are not very wholeſome to mankind, or well-taſted; as field-poppies, ſtinking may-weed, henbane, murrain-weed, and the flowers of rue, whilſt they partly neglect the roſe, primroſe, clove-gilliflowers, and the bloom of wheat and barley. [But this is related *ex fide aliorum.*]

As to buck-wheat, it is obſerved, that in certain lands of *Brabant*, called *Kempen* (and not the lands belonging to the *Abbacy* of *Kempten* in *Germany*, as an ingenious foreigner relates by miſtake) the huſbandman raiſes buck-wheat in ſmall fields near home, and places round them, under the hedges, a great number of bee-hives, from whence he draws much profit, for no plant affords theſe inſects a better ſupply of materials for making honey.

This

[r] This plant, aſſiſted by the culture of a skilful gardener (let him only be careful in what ſort of ſoil he raiſes it) may receive, perhaps, almoſt as many improvements as the auricula did. Its branches will riſe to an height of 3 feet: And no vegetable would better adorn flower-pots in large chimneys; for, if the water is changed, it continues blowing near a fortnight after cutting. Its *ultra*-marine, blue colour, is the fineſt that can be ſeen, and the ſtalks are garniſhed with flowers from top to bottom.—There is reaſon to think, that dyers might extract an uſeful tincture from the roots. This plant grows wild in hard braſhy ſoils.

This experiment may be tried in almoſt every place; but I relate not the fact from my own knowledge, any farther than that bees are very fond of ſucking buck-wheat flowers.

It is much to be lamented, that *one* good *nurſery-man*, or *ſeeds-man*, (I wiſh I could find a *more proper* word whereby to expreſs my idea) is not encouraged to ſettle in each county of this kingdom, that lies above ſixty or eighty miles from *London*. The country gentry, and their tenants, would ſoon feel the advantage of ſuch an eſtabliſhment: And each nurſery-man, of this kind, *ought to have an honorary ſtipend* from the *government*. It is not our intention that he ſhould employ himſelf (*that* being more properly the gardener's buſineſs) in raiſing ornamental exotic trees, choice fruits, flowers, and flowering ſhrubs; but in producing *ſuch* trees, fruits, and plants, as are only profitable and uſeful in rural œconomics: As timber-trees of all ſorts, foreign and domeſtic; wood for joiners, cabinet-makers, &c. apple-trees for cyder; common eating-fruits for markets; ſets for live-hedges, &c. and that he be careful to cultivate all ſorts of plants which afford wholeſome food for cattle; that every diligent cultivator, in the neighbourhood, may know where to apply for a ſtock of young trees, ſets, or ſeeds near his own home, and upon eaſy terms. Such provincial nurſery-men ſhould be under the inſpection of the national directors of huſbandry, and ſhould be nominated and removed by them.

When *James* I. formed his laudable ſcheme of encouraging the culture of mulberry-trees throughout *England*, for feeding ſilk-worms, he pathetically exhorted the nobility, gentry, and clergy, by letter, to purchaſe ſeeds of the beſt kinds, and beſtow them on their neighbours; and ſome, I believe, were procured and diſtributed at his own expence.

pence. In like manner the king of *Prussia*, the other day, supplied his husbandmen with seed-corn; and with good reason, for nothing great and extensive can be effected in agriculture, except the sovereign of a country lends his encouragement and assistance as well as protection.

London, very improperly, is at present the nursery for all *England*: But, without mentioning the expence, difficulty, and hazard of carriage, there is an objection remains, that appears, in my judgment, to be *instar omnium*, which is, that the trees and plants, removed from the environs of our metropolis, pass from a warm manured artificial soil into a common, cold, neglected earth: For such, in general, is the difference between a field close by *London*, and an ordinary country field; whereas, in all transplantings, one would naturally wish to remove from a *poorer* into a *richer* earth; but not *vice versâ*.

It may be observed also, occasionally in passing along, that, as the soil of almost every county has its general predominant cast and temperament, it is not improbable that trees and plants, removed only ten, twenty, or thirty miles, will assimilate better with the nature of the soil, than if transported to a distance of one hundred or two hundred miles.

That they will take root sooner is self-evident. Nor does this remark interfere with what I have recommended in another place concerning the advantages of procuring seed-corn or grass-seeds from a far greater distance; which seems to arise from the all-wise appointment of Providence. We can easily dispense with the absence of some particular trees, but not so easily with the want of wheat, grasses, and leguminous plants: Which (making some few exceptions here and there) I have already called *universal growers*, provided they are cultivated

ted by the *hands of the diligent*.—In case they degenerate, or yield a scanty produce, the fault must be laid on man's remissness and inattention; *yet had I planted thee*, says scripture, *a noble vine, wholly a right seed; but then thou are turned into a degenerate plant of a strange vine unto me.* JEREM. ii. 21.

Quick-set hedges, better, perhaps, than what farmers now commonly use, are of great antiquity. *Homer* mentions them; [b] *Columella* treats of them professedly. Nor is it much to be doubted, but that several quick-set fences and hedges might be brought into use as well as those of white and black thorns. Witness the holly-hedges in *Scotland*, and those of *wild service* [c] in *Sweden:* Not to mention the barberry-tree, privet, yoke-elm, and spindle-tree, [d] (all of common *English* growth:) And, where slighter fences are wanted, *French* furze, eglantine, or wild rose, and even goose-berry bushes.—At the same time, truncheons of willows might be set in the form of a St. *Andrew*'s cross, in moist damp places.—As to the *mimosa*, [e] brought of late years from *Panama* to *Jamaica*, one may have some reasons to doubt its thriving in our colder climate, though, if I mistake not, experiments have been made upon it lately in *Sweden*, in order to raise a strong substantial fence.

[b] ODYSSEY, book the last: Where the poet describes *Laertes* employing himself in husbandry, and taking care of his garden.

[c] I am inclined to think that the wood of the wild service is preferable to box for engraving prints upon: As it is sufficiently hard, yet at the same time mellower and less brittle. Nay, some engravers at *Rome* have assured me, that *Marc Antonio* cut several prints on *this* wood.

[d] *Euonymus*.

[e] The *English*, in *Jamaica*, call this plant the *thorned sensitive*.

Nevertheleſs it is more probable, that the paſſion-thorn of *North-America* may be applied ſucceſsfully to ſuch purpoſes: (See a print of it, Plate III.) Nor ought it to be forgotten, that *Hartlib* recommends the *locuſt-plant* upon like occaſions; and for one reaſon, amongſt many, which renders it highly acceptable to the generality of huſbandmen, and that is, becauſe we ſhall find it to be a very quick grower.

But no fence, of the ſolid permanent kind, pleaſes me ſo much as the *horn-beam hedges* in *Weſtphalia*, and other parts of north *Germany*; this being the ſort of fence which beſt anſwers *Columella*'s definition of a good hedge:

——Neu ſit pecori, neu pervia furi.
De Hortis.

When the *German* huſbandman erects a fence of this nature, he throws up a parapet of earth, with a ditch on each ſide, and plants his horn-beam ſets [raiſed from layers] in ſuch a manner, as that every two plants may be brought to interſect each other in the form of a St. *Andrew's* croſs.——In that part, where the two plants croſs each other, he gently ſcrapes off the bark, and binds them with ſtraw thwart-wiſe. Here the two plants conſolidate in a ſort of indiſſoluble knot, and puſh from thence horizontal ſlanting ſhoots, which form a ſort of living paliſado, or *chevaux de friſe*. So that ſuch a protection may be called a rural fortification. Theſe hedges, being pruned annually, and with diſcretion, will, in a few years, render the fence impenetrable in every part. It is not uncommon in *Germany* to ſee the ſides of high roads thus guarded for ten miles together: And it were to be wiſhed, that all lovers of huſbandry, in *England*, would follow the ſame

ſame example. Even upon our great turn-pike roads, it is a melancholy, and, to ſay truth, a ſlovenly ſight, in a land famous for agriculture, to find, ſometimes, no mounds or fences at all (though the adjoining fields are rich, arable, and paſture lands) or, at beſt, to meet with gaps and ſhards every hundred yards, large enough, not only for a ſheep, but even for an elephant to enter. Of this foreigners ſee very glaring inſtances, not twenty miles from our metropolis.

I am the rather inclined to recommend horn-beam hedges managed as above, becauſe this tree is not delicate in point of ſoil, but will thrive on ground ſeemingly barren. Its wood is preferable to that of the yew or crab for yoke-timber, mill-cogs, heads of beetles, or handles for tools. If the horn-beam be judiciouſly pruned, it will ſend forth lateral ſhoots, even from that part of the ſtem which is within 3 inches of the ſurface of the ground. It is, moreover, a ſpeedy grower, and, by the irregularity of its ſtubborn horizontal branches, deters cattle from browſing the leaves, or attempting to force a paſſage through.

It may alſo be obſerved, that certain remains of *Gothic* ſovereignty, called *laws for the better preſervation of game*, are very prejudicial to the well-being of huſbandry: (At leaſt, according to the tenour of theſe laws, in moſt countries, as well as the manner in which they are enforced.) For, if any perſon has an equitable right to game, it ought to be the occupier of the ground, who keeps and maintains the creatures we are ſpeaking of. But this is a trifling expence, or damage, in compariſon of the loſſes which the cultivator ſuſtains from an inundation of ſportſmen, unqualified by law, and void of compaſſion to the poor huſbandman. Indeed, all gentlemen, of humane diſpoſitions, make their tenants

and other farmers ſome recompence for ſuch waſte and depredations committed.

I ſhall ſay little in this place concerning *publie granaries*, notwithſtanding the late excellent diſcoveries and improvements made by *Du Hamel*, *Pezenas*, *Intieri*, and others; becauſe, upon the whole, I think public granaries quite *detrimental*, rather than *uſeful*, in a free ſtate like ours. *National* and even *provincial* magazines of corn will naturally produce *monopoly*: And an undue fear of famine, [d] joined with much anxiety about hoarding up grain, (which will put a ſtop to exportation) is one of the ſureſt methods I know of bringing on a dearth. [e] Nay, ſuppoſing the care of national magazines was committed to the management of the moſt ſenſible and beſt principled men that can be found, yet how few would engage in ſuch an undertaking without propoſing to themſelves ſome ſort of recompence for their trouble? And, of courſe, the œconomy of a private merchant muſt not be expected from publick undertakers, or at leaſt from their ſucceſſors.

On the other hand, free vent and exportation awakens the farmer's induſtry, and ſurprizingly multiplies the culture and production of grain; but the effects of a contrary practice may be ſeen, with half an eye, by all travellers in the *Roman* eccleſiaſtical ſtate, where the huſbandman raiſes no more corn, than juſt ſo much as he thinks ſufficient to ſupply

[d] Metus in deteriora ſemper inclinatus eſt interpres. Livii *Hiſt.* l. xxvii. ſect. 44.

——Plurima verſat:
Peſſimus in dubiis augur, timor.——
Stat. *Theb.* l. ii. ℣. 5.

[e] La crainte de manquer des graines, & les precautions qui en reſultent, entraînent dans l'écueil que l'on veut eviter.
Police des Graines, p. 23.

ply the uſes of his own family: [f] All beyond that point is labour thrown away for the ſake of other people:

Sic vos non vobis mellificatis opes.——

Nothing hurts a nation like ours, where free ſale and encouragement is allowed the cultivator of grain, except it be ſome ſudden unforeſeen *ſcarcity*, [g] for I will not call it *famine*; ſince famine can rarely happen in a country where corn is cultivated, not only for domeſtic, but foreign uſes. Men will naturally raiſe enough (and, perhaps, ſomething more than enough) of any production, whoſe ſale is open and certain: And if ſome diſaſtrous ſcarcity ſhould happen once in 15 or 20 years, from the inclemency of ſeaſons, it will ſeldom laſt longer than one year: And as ſome corn (the produce of a former year, in a country where agriculture flouriſhes) may always be ſuppoſed to remain in hand, it will, of courſe, help to make ſome amends for any preſent deficiency.—Nor are theſe ſhort periodical ſcarcities ſo terrible, in truth, as ſome have repreſented them: For obſerving perſons have remarked, when a ſcarcity has prevailed in one part of a kingdom, and not in another, that labouring people have thought it worth while to quit a plentiful diſtrict, and reſort to one where proviſions are ſcarcer, in order to procure better wages.——

Sicily tranſported an immenſe quantity of corn each year to *Italy*; and, for that very reaſon, the

[f] When a *Roman* huſbandman raiſes a crop of corn, an agent of the *Pope*'s granaries fixes the price at ſo much a buſhel, which price the poor huſbandman cannot diſpute, nor has he the liberty to ſell to any other.

[g] We have ſhewn before, that ſuch years of deficiency often ſucceed years of plenty from aſſigned reaſons.

Sicilians ſuffered no famine, but the *Romans* frequently.

In the next place, it is never advantageous for a nation that corn ſhould *bear too low a price*. What the manufacturer gains by keeping his workmen cheaper (I mean beneath a certain moderate price) is over-deducted by the loſſes the huſbandman and landlord ſuſtain. A good price of corn animates the cultivator, and procures plenty: Whilſt plenty naturally increaſes population.——

Thoſe who have opportunities of peruſing any *MS.* chronicles of *Engliſh* agriculture with care, will find that the art of huſbandry flouriſhed moſt, when corn kept longeſt upon an equality of price:—— And to this remark common good ſenſe will ſuggeſt another: Namely, that to prohibit, cramp, or tax any production or commodity, is to operate againſt its activity.

Yet, though I declare my ſentiments thus freely againſt *provincial* or *national granaries*, it ſhall, however, be acknowledged, that the new foreign method of conſtructing granaries is wonderfully ingenious, and admirably well contrived; (ſuch receptacles for keeping corn being cheaper built, and containing five times more grain in the ſame ſpace, as well as anſwering every other intention much better than the buildings contrived by our anceſtors for the ſame purpoſe:) And, of courſe, I recommend the uſe of them earneſtly to gentry, farmers, *&c.* [h] for their private advantage and emolument; being for promoting, as much as lies in my power, the convenience and well-being of individuals, and only deſirous to put ſociety upon its guard againſt *whatever* may terminate in *public monopolies*: Which are the curſe of all free induſtrious communities.

But

[h] See an *upright* and *ground-plot* of theſe ventilating granaries in the *Traité de la Conſervation des Graines*, 12°. p. 206, by *M. du Hamel*.

But the private granaries here described and allowed (by which I mean stocks of corn laid up by individuals) can scarce possibly degenerate into any monopoly, but, on the contrary, enrich the vender (by whom we ought to understand the cultivator) and prove advantageous to the buyer. Nor see I any reason why husbandmen should not be encouraged to make the most of their industrious profits, and reap the fruits of their prudent foresight, whilst they act upon honest principles, and render service to the community.—And, though all men have an equal liberty to erect granaries for the productions they raise, yet still it is our fault, if there are regrators, commissioners, or monopolizers amongst us; nor can we accuse the cultivating individuals in this case of avarice, extortion, or making an unlawful profit. The husbandman here, in common with the rest of the society, is only the merchant of his own productions; every man allows he ought to gain something, and that he is guided by interest like the rest of his neighbours.

No part of natural history is less studied than the discovery of *water-colours* for miniature painting, washing prints and maps, and, above all, useful *tinctures for dyers*. Here opens a new field for the ingenious naturalist and chymist to walk in.—The *American* isles are almost totally exhausted of their *indigo*; and something may soon be wanted by way of *succedaneum*—Now many plants, says an ingenious foreigner [i] (that, like the *anil* [k] and several others, contain a deep green juice) have in them

[i] *Reflexions sur l' Agriculture*, 1760, 8°. p. 27. [*Ecrites par un Gentilhomme dans le Service d' une Cour de l' Allemagne.*]

[k] *Anil* is the old *English* name for the Indigo-plant. See the Index to *Lovel's Herbal*, printed in 1659. *Morrison* also gives the same name to Indigo in his book of plants, published at *Oxford* in the last century. *Linnæus* calls this plant *indigofera*.

likewiſe a blue tincture, if he could diſcover the means by a proper fermentation of diſcharging a certain yellow caſt that eclipſes the blue.

Of the prime ſort of *Indigo*, a native of *Mexico*, which is held in the higheſt eſteem, I am not enabled to give the reader a true drawing; nor can I ſay that any attempts have been made to raiſe it, either in our colonies or the *French* ones. But there is a ſecond very uſeful ſort (and concerning this more ſhall be ſaid immediately) which, I believe, grows wild in *South Carolina*, as well as in *Louiſiana*, and ſome of the better parts of *Canada*.[1]—Now, provided the *Gautimalla*, or *Mexican* ſort, may not happen to ſucceed in this our newly-acquired country, or in caſe it requires more care than planters are willing to beſtow, then the *wild* Indigo (for I give it this name in contradiſtinction to the manured cultivated *Guatimalla-Indigo*) may be raiſed and encouraged in *Canada* without the leaſt fear of ill ſucceſs; which may be proved, if it were neceſſary, beyond all contradiction.

The *French* coloniſts of *Canada* (whilſt they had opportunity) were very remiſs in this reſpect; for, inſtead of beſtowing due culture on their own *native plant*, they have, without variation, procured ſeeds from the iſlands.

It is much to be believed, that the Indigo-plants, on the continent of *Louiſiana* and *Mexico*, are of the ſame kind. My reaſon is, they are reported to agree

[1] The writer of theſe Eſſays is ſenſible that many of the vegetables, taken notice of in this article relating to *Canada*, are, at preſent, only natives of *Louiſiana*; but flatters himſelf, that he is ſo far experienced in matters of culture, as to pronounce that almoſt any vegetable which flouriſhes in *Louiſiana*, may, with due care and management, be cultivated ſucceſsfully in the better parts of *Canada*: And here, by *Canada*, he means all the land which the *Engliſh* formerly claimed under the denomination of *Carolana*.

gree in size, juiciness, and a more lively colour in their green leaves.

We have here given a faithful representation of the native Indigo-plant of *North America*, drawn upon the spot, by *M. du Pratz.*

The INDIGO-PLANT; *leaf, flower, pod, seeds; and its appearance after cutting.*

But, however, setting aside the raising of this sort of Indigo which I have called *wild*, merely from compliance with the common manner of speaking, as it has never been cultivated by just rules of art, it may sufficiently reward our colonists, till such time as ingenious cultivators from *England* have examined more thoroughly into the matter, to raise, what is more generally called, the WILD INDIGO of the *French* and *British* islands.

This

This plant affords a colour very nearly equal to *that* of the other. Being of an hardy nature, no great attention is required in its culture; and, as it is a larger plant, will produce equal profit to the proprietor, with ſmall expence and leſs care. [a]

I am convinced that one of the moſt advantageous methods of raiſing an Indigo-plantation is to manage it as lucerne is ſometimes managed, that is to ſay, drill the ſeeds in lines with intervals of 3 feet 4 inches, keep the field free from weeds, and make uſe of the hoe-plough thrice a year. This will produce a larger and finer crop than by making the rows 15 inches aſunder, which is the common practice in the *Engliſh* and *French* iſlands.

An acre of rich land, well-managed, will, as I am informed, afford 500 lbs. weight of Indigo in 12 months, and 10 *Engliſh* labourers are ſufficient to manage 20 acres, and employ themſelves occaſionally on other matters.

There is alſo ſome reaſon to think, that the ſhrub called *tuna* (I give it the name of a ſhrub, though it riſes to an height of 10 or 12 feet) might be raiſed with ſucceſs in the warmer parts of *Canada*. [b] Some ſay, that in the fruit of the *tuna* the inſects breed, of which *cochineal* is made: Others only aſſert, that theſe

[a] There is alſo a little ſhrub called the *baſtard-indigo (amorpha, Linnæi)* which many have thought may be raiſed in *England* in an open garden; more, perhaps, for curioſity and its ſingular appearance, than as any object of real advantage. Some of theſe plants in *France*, though expoſed to the air, ſupported the winters of 1753 and 1754. It is true, many of the branches were deſtroyed by the ſeverity of the ſeaſon, but the plants puſhed forth with vigour at ſpring, and formed an agreeable buſh. In the cold ſeaſon it may not be amiſs to ſpread ſome mulch over the roots.

[b] Coxe's *Hiſtory of* Carolana, p. 84, 86. See alſo *Virginia* and *Carolana, truly and rightly compared*, by *Edward Williams*, 4°. 1650. — *N. B.* Our original *Carolana* (of which the two *Carolina*'s are a portion) contained the ſouthern parts of the preſent *Canada* and *Louiſiana*.

these insects feed on the flowers and fruit of the *tuna*. The flowers are of a beautiful colour; sometimes of a deep red, and sometimes of a paler: But then the latter are striated and shaded with crimson lines of a stronger and richer tincture. The fruit is large and juicy: The juice being blood-red.

I am informed, that this vegetable is a species of *cactus*.

But how are these or an hundred such-like improvements to be expected from banished criminals of our own country, and negro-slaves from *Africa*? Which latter may be called God's free creatures as well as ourselves, though they are deprived inhumanly of their liberty, without having given any previous offence, so far as we know either to individuals or the laws of society.

To these remarks, founded on humane and religious motives, I shall add a prudential one taken from the elder *Pliny*. "It is the worst œconomy possible," says he, "to employ slaves and criminals in the culture of lands; agriculture will never be carried on successfully by men of desperate lives and fortunes." *Coli rura* ERGASTULIS *pessimum est, & quicquid colitur a* DESPERATIS. [a] What can we expect

[a] *Histor. Natural.* l. xviii. c. 6. *Dryden*, almost a century ago, has painted this ill policy of ours in the strongest colours:

> Here let my sorrow give my satire place,
> To raise new blushes on my *British* race;
> Our sailing ships like common-shores we use:
> And thro' our distant colonies diffuse
> The draught of dungeons, and the stench of stews.
> Whom (when their home-bred honesty is lost)
> We disembogue on some far *Indian* coast:
> Thieves, pandars, pailliards; sins of ev'ry sort;
> These are the manufactures we export:
> And these the missioners our zeal has made;
> For (with my country's pardon be it said)
> Religion is the least of all our trade.
>
> HIND and PANTHER, part II.

pect from husbandmen, continues he, *damnatis manus, inscriptis vultus?—Honestis manibus omnia lætius proveniunt, quoniam & curiosius fiunt.* [f]

The *sophora* of *North America* (let it be observed, I speak not here of any other sorts of this plant growing in warmer countries) has been thought, by a nobleman of *Germany*, one of the best judges of agriculture I know, to be capable of being raised in *English* and *German* fields. It is a leguminous plant, and consequently may afford excellent food for cattle, either green or dried. Its *stamina* differ from those of *diadelphian papilionaceous* plants. Some imagine it to be a species of *ervum*.

The *wax-tree* [g] also might have its œconomical uses in our colonies in *Canada*; and possibly, nay probably, it might be raised in *England*. For this tree is not delicate in point of soil, situation, or climate. It has the appearance of growing, as well in the deep shade of woods, as in open sunshine; and seems to be equally contented with warm countries or colder ones: Prospering without much visible degree of alteration in the parts of *Canada*, near new *Orleans*, or in other parts of *Canada* where the

[f] The president, *Montesquieu*, makes another remark on this subject, which deserves a place in the notes.

The *Romans*, says he, being accustomed to tyrannize over human nature, in the persons of their slaves, had a very imperfect idea of that virtue we distinguish by the name of humanity. Whence proceeds the slavish cast of mind in the inhabitants of our colonies, but from their constant severity to an unfortunate class of mankind? When barbarity prevails in civil governments, what natural justice or harmony of manners can be expected from the individuals?

Hist. de la Decadence, &c. tom. ii. 206.

[g] We have given prints not only of the Indigo-plant and this tree, but of the *ayac*, *copalm*, and *sassafras*, as also of the *salsaparilla*, *passion-thorn*, *esquine*, and bearded *liane*, together with the *plat de bois* and *achetchy*; representations of none of which being as yet to be found in our herbals. As to the *sophora*, I have never been able to procure a drawing of it (I mean the *North-American sophora.*)

the winters are as ſevere as in *Denmark:* And, between which two places of growth, there is a difference of more than twenty degrees of latitude.

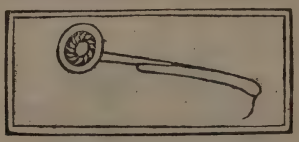
But ſuppoſing the wax-tree ſhould happen to diſlike our *Engliſh* climate (where, perhaps, its culture may be little more than matter of curioſity) yet ſtill ſuch an objection ought to have no weight with our cultivators in ſome parts of *Canada*, where this vegetable is of native growth, and arrives to a great degree of perfection even in its wild uncultivated ſtate.

The WAX-TREE.

This tree which, in truth, deſerves rather to be called a ſhrub, has no one principal trunk or bole, but conſiſts of upright branches or ſuckers iſſuing from eyes or buds in the root. Theſe ſuckers ſeldom riſe higher than nine or ten feet; and nothing can be eaſier than gathering their bunches or cluſters of

of fruit, for the ſtems are as flexible as the ſhoots of an oſier.

The leaves have the ſame ſhape with thoſe of the common laurel in our kitchen gardens ; [e] but they are of a thinner contexture ; nor is their colour ſo ſtrongly marked. The fruit grows in bunches, and forms an aſſemblage not much unlike a tuft or taſſel : From the middle part of which bunch iſſues forth a number of ſtalks about two inches long ; and each of thoſe ſtalks bears, at its extremity, a ſort of little pea, which contains, underneath its ſkin, a ſhell and kernel : The wax lying between the ſkin and the ſhell. All which may be better comprehended by a ſection of the fruit in its natural ſize.



Two ſorts of wax are extracted from the fruit of this tree : The one of a yellowiſh white colour, and the other of a pale green : But the former ſells for more money than the latter, and that by one half at leaſt.

It is true, formerly the *French* coloniſts knew not how to ſeparate theſe two ſorts of wax. They threw the fruit and ſtalks into a cauldron of boiling water : In conſequence whereof, the wax ſoon detached itſelf from the ſhell which it covered. They then carefully took off the ſtalks and ſhells : And, as the water grew cold, the wax fixed ; which they moulded into cakes of a faint-green colour : [f] And even

[e] *Hiſt. de la* Louiſiane *par* Du Pratz, 1758, tom. II. p. 37.

[f] The *French*, capricious in their taſte, diſlike this greenneſs. People of other countries may, perhaps, think a green wax-candle as agreeable as a white one. Queſtionleſs, it is more comfortable to the eyes.

even this wax blanched in less time than the wax of bees is found to do.

But chance, the parent of discoveries, soon pointed out a better method. "The nuts and stalks are thrown into an empty vessel (in this case, says my author, [b] I would recommend a glazed earthern jar) and boiling hot water is poured upon them till they are quite covered. In a short time, or to use his own words, whilst a man may say a *Miserere*, you must pour this water into another vessel that is quite cold; and, in proportion as the liquor cools, the wax fixes itself. This is the yellowish white wax, which will be well blanched, after it has been exposed to the clear air for the space of six or seven days. Then the self-same water is returned upon the fruit and stalks, which are boiled till there is reason to think that all the rest of the wax is separated from them. This is a second effort, which draws forth the green colour by the force of infusion and boiling: And, of course, there is no reason to think, but that the wax, first extracted, must be the purer and more genuine wax.

"The inhabitants of the *French* islands prefer these wax-tree candles to the bees-wax-candles of *France*: For, being firmer and harder, they are not apt to grow soft in warmer climates. Of course, they are more durable in burning; and of this the reason will appear in the next paragraph.

"When the whole process is performed, the remaining water has its uses: For it contracts such an astringency from the fruit and stalks, that, if it be properly mixed with melted tallow, it will bring such candles to the consistency of common bees-wax. ——Besides which, it is an admirable specific in dysenteries, and its effects are more certain than those of the ippokekoana, provided the body of the

[b] Du Pratz, *ut supra*.

the patient be rightly prepared to receive the medicine."

Thus far proceeds my *French* relator:—Yet one inconvenience ſtill remains, and it is almoſt an inconvenience *inſtar omnium:* For, though theſe candles are as hard as can be wiſhed, yet, at the ſame time, they are ſo brittle, that they inſtantly break to pieces, not only by falling, but if they are handled roughly. If art can ſupply this defect, all is done that needs be required.

I would propoſe, therefore, that a certain quantity of goat's ſuet [d] (a very common and cheap commodity in *Canada*) ſhould be diſſolved and incorporated with the melted wax: Which, as I flatter myſelf, will produce two collateral advantages, and, at the ſame time, remove that grand inconvenience which no one hitherto has been able to get rid of. For the goat's ſuet, far from impeding the burning of the candles, will rather aſſiſt it: And being, when it is melted, as white as ſnow, will help to abſorb the yellowiſh tinge in the wax: And laſtly, in all probability, it will change the brittleneſs complained of into an adheſive conſiſtence.

This I know, from good authority, that goat's ſuet is of ſo binding a nature, as to make a neceſſary ingredient in two famous *Italian* cements for joining the pipes of aqueducts, and lining the bottoms and ſides of ciſterns; which ſecrets are ſuppoſed to have been loſt almoſt one hundred and ſixty years. [e]

I ſhall

[d] Candles made of goat's ſuet are whiter than wax-candles: they burn as ſweet, and almoſt as long. Giving, at the ſame time, a clear ſteady light, without ſharpneſs.

[e] Theſe cements were brought much into uſe by one *Balbini*, an *Italian* architect; he was not the inventor of them.—They withſtand the froſts.—I procured the receipts in *Italy*, and believe them to be genuine.

I shall conclude this article with observing, that Providence seems to have provided the continent of *North America* with the wax-tree, to answer many œconomical uses of bees-wax: For, though there is no want of bees in that vast tract of country, yet the race of bears there is so numerous, and of course so destructive to the bees, that by a sort of instinct they form their hives in forest trees, or burrow in the ground like wasps and hornets.

It is highly probable, that *vines* might be multiplied and grasses improved by right culture in some of our colonies: But the native vines of our new acquisition, *Canada*, stand a better chance to be carried to a good degree of perfection. Very considerable are the sums which we send annually to *France*, *Spain*, *Portugal*, *&c.* upon this account. Nay, I have been assured, from the best authority, that even *Ireland* alone expends 3000 *l.* a week in *French* clarets.

Robert Child, the true author of the *famous Treatise on Husbandry*, commonly called HARTLIB'S LEGACY, animated by an enthusiasm which stood, as it were, in the place of knowledge (for *Canada*, at that time, was very imperfectly known to us) saw at least, a century ago, the notable improvements that might be made, and the considerable advantages that might be drawn from a *right management of vineyards* upon that vast continent (a large part of which formerly belonged to us, and was comprehended in the old *Carolana.)* I am pleased to tread in the steps of so great a genius:

——Ire per omnem
(Sic amor est) heroa volo.——
STAT.

Vines grow wild in *Canada* (particularly in the parts near the *Mississippi)* and that almost from the

ſouthermoſt extremities of that country to 300 miles northward. Other accounts [b] aſſure us, that they extend farther, even to 40 degrees of north latitude: Particularly from the ſouth-weſt coaſts of lake *Illinois* to the banks of the river abovementioned; a tract of country equal in ſize to one third of *England*. In many of theſe parts the vines are ſo numerouſly diſperſed, that a man can hardly walk 200 paces without finding them.

Three ſorts may be rendered uſeful for making wine and brandy: The *fourth* ſort is rather a matter of curioſity.

(1.) The firſt ſort grows on the riſing borders of dry healthy paſture meadows. The fruit of it bears ſome reſemblance to one ſpecies of *Burgundy* grape. But as the edges of dry meadows, in this country, are ſkirted with thickets and foreſts, whoſe ſhade and drip are equally hurtful, only a paſſable wine is made from it in its preſent wild ſtate.

(2.) The ſecond kind is much commended by the *Engliſh* writer above cited, [c] and that as long ago as in the year 1651. A *French* author of repute confirms, from his own knowledge, every particular of this account, in a relation publiſhed in 1758. This is the vine that bears the currant-grape, and perfectly reſembles that of *Corinth* in its wood, leaf, manner of growth, and the ſugary taſte of its fruit. Of courſe, a right management of it might ſave the out-going of much money to the *Archipelago*, for a ſpecies of dried fruit ſo highly acceptable to the common *Engliſh* palate. The greenneſs of its leaves and fruit make no real objection againſt it; remove the cuttings of this vine from immenſe ſhady foreſts (for it naturally ſeeks to climb up trees by

[b] Decouverte de HENNEPIN. Voyage du *Baron la Hontan*, &c.

[c] See HARTLIB's Legacy.

by way of support) and plant them (trellice, or cradle fashion) in a vineyard properly prepared, which enjoys an airy sun-shiny exposure, and the leaves and fruit will soon acquire that true colour and taste which are the consequences of being thoroughly ripened. For, if one of these vines, by pure chance, happens to grow in a dry field unencumbered by woods, its grapes are well coloured and luscious.—Of its wine, at present, no judgment can be formed in its wild uncultivated state of nature.

(3.) The *third* sort bids the fairest for making a rich delicious wine, of any grapes in this country hitherto known to us: And doubtless our knowledge, at present, in this article, is extremely limited. It is of the *muscadel-kind*, and grows on the slopes of hills and other dry elevated grounds in the southermost parts of *Louisiana* and *Canada*. The grapes are found to be extremely wholesome. They are of an amber colour, and have a rich sugared taste. Experience has already shewn, that excellent wine may be made from them, upon condition they are cultivated according to art.

(4.) The *fourth* sort is of an uncommon nature, and hardly merits to be called a vine, except from a similitude of leaves and wood. It produces only two grapes upon a stalk, and each grape contains a single stone, or rather a kernel. This fruit has much the size, colour, and *flesh* (as the *French* call it) of a violet damask plum. [d]

Upon the whole, it is certain, that a considerable part of this vast country is of a nature connatural, if I may so speak, to the growth of vines. At the same time, all travellers agree, that some of the native

[d] This corrects a gross mistake in *Hennepin* and *la Hontan*, who say, that the bunches of grapes in *Canada* are so extremely large, that one or two prime grapes in a bunch are equal in size to a middling plum.

the grapes of *Canada* are of an excellent taſte in their wild uncultivated ſtate, whenever a branch gets free from the ſhade and droppings of trees, and enjoys air and ſun-ſhine: Though, at the ſame time the root cannot ſhare the advantage of heat. Not to mention the unwholeſome moiſture dripping from the ſhade above, and the violent ſuction of ſtronger roots (its next neighbours) which continually oppreſs and defraud it: Yet *Hennepin*, *la Hontan*, and others, found the *muſt*, expreſſed from the beſt of theſe grapes, to be extremely good, and preſerved it in calabaſhes, or gourds, many days. [c]—Now we all know the improvements which right culture may make on any vegetables which have natural good qualities.—So that induſtry may render the future and preſent difference of the *Canada* grapes as great as *that* we perceive between a wilding and the fineſt cultivated apple. In proof of this, many travellers have obſerved, that the *auricula*, in its native ſtate and ſituation, at the feet of the *Alps*, hardly exceeds, in beauty, a common primroſe, or cowſlip; and yet diligence and right management, in the ſpace of twenty years, propagated this plant over the whole weſtern parts of *Europe*, and brought it to exhibit the richeſt colours imaginable.

But we are not obliged to rely intirely on the improvement of the native *Canada* vines: Since new ſorts (the growth of other countries) may be carried thither. The *French*, at the diſtance of a league, more or leſs, from our preſent territories (or, in other words, where nothing lies between us and them, but the river *Miſſiſippi*) have raiſed vineyards from cuttings of the beſt vines in old *France* with all imaginable

[c] "The vines of *Canada*, by the aſſiſtance of good culture, might afford wines capable of vying with many of the beſt *European* ſorts."

Decouverte de Hennepin, tom. I. l. i. c. 25.

nable ſucceſs. [s] But theſe vines, and their produce, are ſo well known in our kingdom, that it may be needleſs to ſay more upon that head.

At the ſame time, why might not good cuttings be procured from *Portugal*, *Spain*, the iſland of *Madeira*, *Italy*, and *Hungary?*—This laſt country alone, without mentioning the vintage of *Tokay*, will be found to produce three or four ſorts of wine, which may be thought to approach very nearly to, if not equal, the beſt productions of *France*, having, at the ſame time, a firmer body, and, of courſe, being better enabled to bear the paſſage from *North America*.

Nor might it be amiſs, by way of experiment, to tranſport into *Canada* cuttings of vines [t] from *Baccharah* and *Hockheim*, *&c.* in the lower Palatinate of *Germany*; which, in all probability, might make a return, in a few years, far ſuperior to the firſt expence and trouble. My reaſons for ſuggeſting an attempt of this kind may, perhaps, be obvious to

[s] *M. du Pratz* gives a remarkable inſtance of the fertility of vines in *Louiſiana*. I ſhall ſubjoin the paſſage in his own words:

"Je ne puis m'empêcher (dit il) à ce ſujet de rapporter ce qui arriva dans cette capitale [la Nouvelle Orleans] à un habitant, par où l'on pourra connoitre quelle eſt la fertilité de la Louiſiane. Il avoit planté dans ſon jardin une traille de muſcat, dans le deſſein d'en faire par la ſuite un berceau. Un de ſes enfans entra avec un petit negre dans le jardin qui ſe trouva, ouvert par hazard; c'étoit au mois de Juin, tems où le raiſin eſt deja mûr en ce pays. Ces deux enfans attaquerent une grappe de muſcat; & n'eſperant pas avoir le tems de la manger ſur le lieu, ils réunirent leurs efforts pour l'arracher & l'emporter. Ils en vinrent à bout en caſſant le bois d'ou pendoit la grappe. Le pere ſurvint, & après le bruit ordinaire en pareille occaſion, il coupa, & tailla ce ſarment caſſé. Comme on avoit encore pluſieurs mois de belle ſaiſon, le cep pouſſa de nouveau bois, & donna encore du fruit qui mûrit, & fut auſſi bon que le premier."

Hiſt. de la Louiſiane, tom. II. p. 17.

[t] All cuttings of vines, removed to a great diſtance, ought to be packed up with freſh moſs in an hogſhead, bored through in numberleſs places with a gimblet.

every curious cultivator. For it is well known, that the wines produced from these *German* grapes (however excellent they may be) seem to have something of a natural, agreeable, savage wildness and austerity, which may not be unsuitable to the genius of the *Canada* climate.

There are also some excellent vintage-grapes in *Switzerland*, *Croatia*, and *Friuli*, one kind particularly in the last-named country, which produces a wine that resembles *Madeira* in taste, strength, and colour. A wine, says *Pliny*, which preserved the empress *Livia* to the 82d year of her age, who attributed her longevity to drinking this wine and no other. [g]

It no-ways avails us to remark, that the *French* have made little or no wine in *Canada*, since this proceeded from the natural good policy of the mother-country: Which had wine enough to supply her home consumption, and answer the demands of her neighbours as well as the few gentry of her colonies. *Nor is it ever right or useful in foreign settlements to cultivate any commodity which can be raised, and that abundantly, in the parent-kingdom.* But the case is widely different, when the possession of *Canada* is transferred to *England*.

As the matter before me, relating to our colonies, may be looked upon as almost a new subject to the generality of *English* readers (it being of no small consequence to a trading nation like ours) let me ask leave to enter, for a short space, into a more minute detail: And particularly in relation to cattle, and the culture of some useful vegetables not hitherto much taken notice of. And, amongst other national settlements, I treat of *Canada*, the more at large, because it does not appear to me, that much pains have been taken to extract any very material and

[g] It was then called *vinum Proseccanum*, and now *Prosecco*-wine, from a small village of that name near *Trieste*.

and national advantage from it. Whether the acquisition will ever fully answer the ends proposed, in a commercial or husbandry sense, is more than I know; I am partly dismayed by the old *Carthaginian* reason, *Colonus imbecillior est quam ager*. And, therefore, some lesser acquisition, fully, vigorously, and effectually cultivated, might have proved more really profitable to our nation. *Virgil*'s authority, in this matter, carries a sort of sanction with it:

———Laudato *ingentia* rura;
Exiguum colito.———

Yet still I am inclined to believe, that some notable advantages may be extracted from it, if colonies of sober, skilful, industrious peasants could be settled there instead of negro-slaves and transported felons. [h]

The *horned cattle of the beeve-kind*, in this country, are full as large and strong as ours, though different *from* them in the make of their bodies and their hair. They abound so much in some parts of *Canada*, that hitherto it has been hardly possible to reduce their numbers. The hair, or rather the wool, both of the males and females, is long and curled: So that it may be manufactured into a warm durable sort of cloathing.—Of the flesh of the bull, in its wild state of nature, we shall say nothing: The flesh of the cows is succulent, well-tasted, and nourishing. Their udders and teats resemble those of a mare or doe. Nor are they of a savage disposition in their wild state; for it has been observed, that, when the natives shoot their calves in hunting,

[h] *M. du Pratz*, after 16 years residence in the *French* colonies of *Louisiana*, observes, that hardly any person goes to these settlements or continues there, who understands or applies himself to the cultivation of the earth, or collecting and procuring such things as are the object of commerce. *Hist. de la Louisiane*, tom. III. p. 341.

they will remain, for ſome time, with their young, and lick the hands of thoſe that flea them.—As to the milk of theſe kine, I have never been able to procure any certain information ; but there is little or no reaſon to be doubtful concerning its good qualities.—The male-calves will be made gentle and tractable by caſtration, and, at three years of age, will prove highly ſerviceable in cultivating the fields. This is the main point I contend for.

It may be added farther, that the fleſh of theſe creatures will be improved both in quantity and quality, when they are made tame by the huſbandman ; ſupplied regularly with food and litter, and then fattened according to the rules of art.

Where there is graſs ſufficient, as certainly there is in all the fine parts of *Canada*, it is almoſt ſelf-evident, that a *breed of horſes and ſheep* might be eaſily brought from *Mexico* [1] and encouraged: Eſpecially when art is called in to aſſiſt nature, and the culture of graſſes is greatly improved. Beſides, it may be worth remarking (ſo great is the divine care and bounty in ſupplying variety of food for theſe uſeful creatures) that the introduction of horſes and ſheep into a country that affords us naturally nothing but kine, will occaſion little or no deficiency of paſturage in the proprietor's fields ; for theſe three ſpecies of grazing animals eat not always the *ſame* plants, nor plants of the ſame age, nor the *ſame* parts of the *ſame* plant. *Lucretius*, with that exquiſite elegance and deſcriptive juſtneſs peculiar to him, has painted all theſe ſeveral ſorts of huſbandry animals, as grazing quietly and without envy in the ſame field.

Sæpe

[1] *M. du Pratz* bought *Mexican* cows at *New Orleans*, in *Louiſiana*, for about fifty ſhillings apiece. He bought alſo *Spaniſh* barbs, jennets, and ſheep, at a reaſonable price.

Sæpe etiam ex uno tondentes gramina campo
Lanigeræ pecudes, & equorum duellica proles,
Buceriæque greges, ſub eodem tegmine cœli,
Ex unoque ſitim ſedantes flumine aquaï,
Diſſimili vivunt ſpecie. ——
Tanta eſt in quovis genere herbæ materiaï
Diſſimilis ratio.———

L. ii. v. 659.

The patient ox, mild ſheep, and fiery ſteed
In the ſame tracts of graſs delight to feed:
One common ſtream their thirſty wants ſupplies,
They ſleep beneath one canopy of skies:
Each leads a life peculiarly his own,
And eats what Heav'n aſſigns his kind alone:—
For herbs (and nature thus ſuſtains no waſte)
Give diff'rent parts for food of diff'rent taſte.

It may be obſerved farther, that neither horſes nor kine bite ſo near the ground as ſheep can: And that from the ſize and make of their mouths and teeth. Nay, what is ſtill more remarkable, the cloſer ſheep bite, the finer-taſted the natural graſs becomes; it alſo grows thicker and ſhoots faſter.

Such is the peculiar care and bounty of Providence! All graſs, if ſhorn, or fed, before the ſeeds are formed, grows the faſter for being cut or grazed! But, after the ſeeds are formed, it begins gradually to exhauſt and impoveriſh the ground.

The *goat and chevreuil* are original natives of *Canada*, and ought to be encouraged. For, beſides being as generally uſeful as any other graminivorous animal, they rob none of them in point of food: Deſpiſing richer paſturages, and browzing on plants that have harſh, acrid, deleterious, and even poiſonous qualities. How beautifully has the author, laſt-cited, deſcribed theſe circumſtances in goats and

and ſwine with all the charms of his diffuſed poetry!

Barbigeras oleaſter eò juvat uſque capellas,
Diffluat ambroſia quaſi verò & nectare tinctus ;
At nihil eſt homini fronde hac quod amarius extat.
Denique amaracinum fugitat ſus, & timet omne
Ungnentum : Nam ſetigeris ſubus acre venenum eſt
Quod nos interdum tanquam recreare videtur.
Lucret. l. vi. v. 970.

The ſavage olive charms the goats harſh taſte,
Its branch ambroſia, and its juices nectar ;
But bittereſt of bitter is its touch
To human lips.—The ravenous ſwine eſchew
Odorous marjoram, and arts perfumes :
(So elegant to man!)—Thus what revives
Our ſenſes, is coarſe nauſeouſneſs to them,
And painful luxury!

But to return from theſe pleaſing pictures drawn by the hand of the venerable father of *Latin* poetry ; all our ideas of improving the culture of the land and commercial intereſts of our colonies, however promiſing and advantageous they may appear to be, can never be realized effectually, [a] till perſons skilled in every branch of rural œconomics are ſettled in thoſe colonies by public appointment : And, in ſuch caſe, an account of the experiments and improvements ought to be printed every year. A board of *agriculture*, therefore, ſeems to be as neceſſary as a board of *trade*.

This is the main point which I contend for.

Of

[a] Noſtro quoque vitio accidit qui rem ruſticam peſſimo cuique ſervorum velut carnifici noxiæ dedimus, quam majorum noſtrorum optimus quiſque tractaverit.

COLUMELLA, l. i. *in Præf.*

Of the advantage of the *fur-trade* I shall say nothing, as it is well known to every commercial man. Indeed, one great *desideratum* is here wanted, which is to kill the nits which breed in the skins, long after the animal is dead to which the skins belonged.—To get over the last inconvenience may not be difficult: (If there were occasion, I think one might name a remedy:)—But to hinder *France* from being universal mistress and arbitress of fashions, language, *&c.* and *disgracing* furs as she has already done, is a work of labour, perseverance, and spirit. Too much time has elapsed: Men wear her fetters with pride, and, as they fancy, with a becoming grace:

——*Volentes*
Per populos *dat* jura, viamque *affectat*.—

It was certainly an oversight, at the peace of *Aix de Chapelle*, to give up the *Roman* language (which lay fair, neutral, and common to all *Europe*) and tacitly allow the *French* tongue to be the standard-language of the western world; and so much the rather, as it will generally appear from history, that the adopting a neighbouring language paves the way to the introduction of a foreign power, sooner or later.—But to return from this short digression.

The colonists of *Canada* might carry on a considerable trade with the *hides* of larger horned cattle, and, as they have no want of bark for tanning, might prepare these hides at home with tolerable perfection. Nor need we mention the skins of elks, chevreuils, goats, and kids which might be dressed in the same place after the same manner. Pasturage is so abundant here, that the old wild bulls have frequently in them one hundred, and sometimes one hundred and fifty pounds weight of tallow:

And

And it is good œconomy to kill them; for, being unwieldy with fat, and incapable to fly, or make reſiſtance, they always fall a prey to the wolves, which are ſmall, and unable to deſtroy them, when they are young and ſtrong.

As to timber, the ſorts of it, either for houſe or ſhip building, cabinet-making, vaneering, *&c.* are not to be numbered. The *Canada-cypreſs* is one of the moſt ſtately trees in the known world. It works eaſy, with a fine poliſhed grain, and yet is almoſt incorruptible in earth or water, nor will the worms at ſea venture to attack it. The *cedar* of this country might be applied to various uſeful purpoſes. Wrought into paliſadoes and pales, it will laſt conſiderably longer than our beſt oak; and, as worms never enter it, it may be very uſeful for planking ſhips [b].

Maize may be raiſed in *Canada* to what quantity we pleaſe, for it grows there naturally in great abundance. A ſpirituous liquor may be extracted from it, or it may be made into malt.—*Hops*, at the ſame time, are natives of the country, and grow chiefly in the ravines or hollow-ways of mountainous lands, from whence ſets may be taken at pleaſure, and, plantations formed *ad infinitum*. Experience alſo ſhews, that *barley* may be raiſed here with great eaſe.

It

[b] The *French* in this country have diſcovered 2 kinds of pines, and 4 of firs: White and red cedar-trees, red oaks, the white-wood, female clouded maple, 3 ſorts of walnut-trees, red elms, abundance of beech foreſts, and cherry-trees finely veined, and of an excellent grain for cabinet-makers.

The white-wood, beſides its other uſes, affords a thread in the inner pellicules of its bark, which may be manufactured like hemp —And thus a plant called *cabuya*, or *pita*, which grows in great abundance on the mountains of *Peru* near *Lima*, gives us a very fine ſtrong thread. *Voyage de Dom. John & Anth. Ulloa.*

The white-wood tree *(bignonia)* is of a large growth, and yields abundance of ſhade. The leaves reſemble thoſe of a laurel.

It is possible to raise as much *rice* here as can be desired, which would save the out-going of considerable sums of money from *England* to the *Levant*. Nor might it be a bad *succedaneum*, when corn is dear.

The *olives* preserved for eating, or pressed for oil, are acknowledged by natives of *Provence*, settled in *Louisiana* and *Canada*, to be equal in goodness to those of their own country.

Silk might be procured here in great quantities, for the country abounds with mulberry-trees, both white and red, which grow naturally in the upland grounds. This silk is as strong and fine as that of *France*. Nor is any thing more easy than to raise plantations of these mulberry-trees, where silk-worms may be found in great abundance.

Cotton might be made another article of commerce; not the *tree-cotton*, but the *cotton-plant*. The wool of this cotton is not so long, nor so soft as the former; but is white and fine, and may be turned to good account. Mills ought to be made to separate the seeds from the down, and in that consists the whole difficulty of this manufacture. [c]

Indigo (in addition to what I have observed in another place) may be raised here to as great perfection, at least, as in the *American* islands; but, whether it can be ever brought to vie with the *Mexican* indigo, is a point to be excepted for the present. Nor will these plants admit of more than three cuttings in one year, whereas those of the islands are cut four times: But then the colour of the plant's juice in *Canada* is more lively (being less tinged with a brownish yellow) and the produce of leaves more abundant.

Raising *tobacco* is a favourite branch of agriculture in our *English* colonies. It is a native of *Canada*,

[c] The cotton, here spoken of, is called in our colonies, *French cotton*.

nada, and the inhabitants have made uſe of it from times immemorial for ſmoaking in their ſacred calumet of peace. This plant (of which *Canada* produces two ſorts) is of a large growth, even in the wild ſtate of nature; but has a pleaſing ſtrength without being heady.—When rightly cultivated and cured, it is thought neither the *Oronoko* nor *Virginian* ſorts will exceed it.

No ſoil is better qualified to bear *ſaffron*; which will prove a very profitable merchandize, if ſent only to *Mexico*, where the *Spaniards* have a great demand for it.

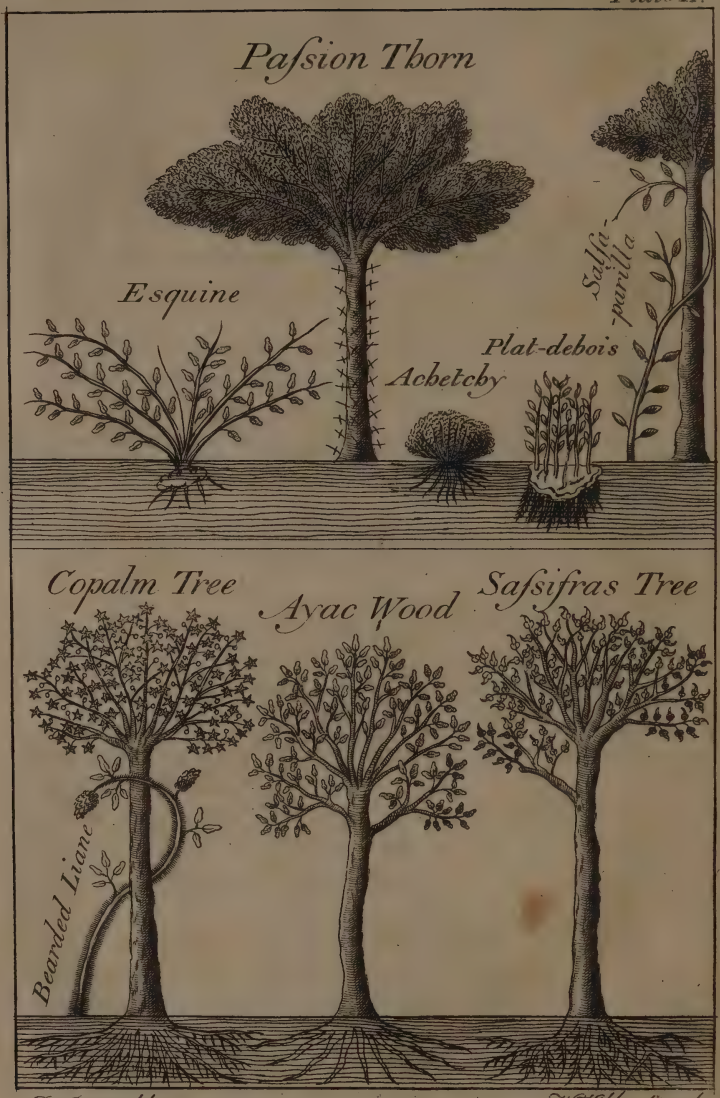
The *wild hemp* of this country (which uſually grows near the lakes) is of a large ſort, and fitteſt for making cables and ſtrong cordage. *Flax* has been ſown here with good ſucceſs.

It is poſſible that painters may procure from hence ſome *new ſorts of colours*. I will mention only the *ſoot-black*, which may be extracted in abundance from the larch and other reſiniferous trees with which this country abounds.—Miniature-painters, waſhers of prints, and eſpecially dyers, may find a new ſupply of colours. In the latter inſtance, we will juſt take notice of a couple of vegetables, the *ayac-wood* and the *achetchy:* Both which, as I am informed, are found in ſome parts of *Canada*, as well as in *Louiſiana*.

The *ayac-wood* is a little tree, the decoction of whoſe chips yields a fine yellow colour. The leaves, boiled and ſqueezed, give the ſame colour, but of a paler caſt. (See a print of this tree, PLATE III.)

The *achetchy* is a ſmall humble plant, about ſeven inches high, and grows only under the ſhade of large trees in foreſts. The ſhoots of its root, which are numerous, are about 3 lines diameter, and full of a bright juice, reſembling, in colour, the blood of a pullet. As the natives are not fond of yellow, they uſe *ayac* for a ground-colour, and afterwards

the



Du Pratz delin. W. Hibbart sculp.

the *achetchy* for a second tincture. If the thing dyed passes through these two operations, what was originally white, and then yellow, becomes a bright scarlet: And the hair, or wool of the *Canada* wild beeves, which is naturally of a chesnut colour, is transmuted into a brown red.

Nor will medicinal vegetables be wanting, whenever a skilful naturalist or physician shall examine the productions of this immense tract of country. The *salsaparilla*, [d] in particular, is equal in goodness to that of *Mexico*. The *sassafras* tree (which is an ever green) grows to a large size, insomuch that the bole or trunk has been sometimes found to measure more than two feet diameter. The *esquine* has the same sudorifical virtues with the two former trees, and a decoction of its roots is famous for encouraging the growth of hair. It is a little shrub, armed with prickles, resembling a thorn-bush, and one species of *liane*.

There is a species of *liane*, called the *bearded*, being armed with little fish-hooks about an inch long in the shank, and as large as an horse-hair, which lay hold of any tree that grows near it, but particularly (by a kind of sympathy, as it were) on the copalm tree. So that if a plant of this species of liane grew one foot, for instance, from any common tree, and two feet from the copalm tree, its branches would forthwith diverge towards the latter. A decoction of this plant is of singular use in curing fevers, so that some prefer it to the quinquina.

The fruit of a third sort of *liane* is remarkably good in some obstructions, and a fourth sort is known by the natives to cure the wounds given by poisoned arrows.

Ano-

[d] See prints of the salsaparilla, sassafras tree, esquine, bearded liane, plat de bois, and copalm tree, in Plate III.

Another plant, named, by the *French*, *plat de bois*, having a flat root like a tea-saucer, or the *Norway* and *Swedish* turnip, called *napper*, is a more powerful sudorific than any of those abovementioned, and preferred by the natives in cases of emergency.

But the glory of the *North-American* forests is the *copalm tree*, which grows in such abundance, that Providence seems to have placed it near at hand for all that want it. No one, as yet, knows one fifth part of its medicinal uses. Its balm, which, if I mistake not, is called, in *France*, *copahu*, is a most excellent febrifuge, and of sovereign use in dressing green wounds and ulcers.

It may be needless to mention the various sorts of *marle*, *gypsum*, and *fine clays* in *Canada*; which latter may be used for making porcelain, earthern vessels, bricks and tiles.

Bricks have been sold, in some of the *French* settlements, for ten shillings a thousand, which is as cheap as they can be bought for in any village in *England*.—*Salt-petre* is very common; *iron-mines* have been discovered in *Louisiana*, nor is it much to be doubted, but that they may be found in *Canada*, as also *lead*, *copper*, *&c.* and many other valuable minerals. Nor will the search after them be difficult or expensive, if the borer be made use of. Such grounds are particularly to be examined as stand high, and where the few vegetables it produces are meagre, crooked, yellow, and cankered, or, to use the poet's words, it must be a sort of land

Where half an acre's corn is half a sheaf. [a]

Much might be done both here and in our other *American* settlements, if men were animated with the true spirit of industrious cultivation. But it has been observed, ever since the foundation of modern

[a] Parnell.

dern colonies, that the *Engliſh* and *French* (for it may be needleſs to mention the *Portugueſe* and *Spaniards*) have choſen generally to adopt the old barbarous practice of culture from the natives. And why? Becauſe it is more lazy, as well as more compendious. As therefore, at preſent, we hardly know the *actual* productions of our *American* ſettlements, how is it probable we ſhall be acquainted with the *potential* ones, except choſen perſons, as before ſuggeſted, are there ſettled; being men of approved skill in agriculture, and every other part of natural knowledge, which ſupplies food to man and cattle, as well as materials for arts, trade, and commerce? —*France* has not been inactive in making ſome diſcoveries of late years; but the *Danes* and *Swedes* ſeem to me to have taken a turn of a more practical advantageous nature to ſociety; employing themſelves (and that ſucceſsfully) in cultivating at home all the new uſeful ſorts of trees in the foreſts of *Canada*, whilſt the *French* were occupied in ſettling the figure of the earth.

Some or other of our colonies might alſo ſupply us with great quantities of hemp and flax, maſts for ſhips, and various ſorts of timber for ſolid or elegant uſes; to which may be added pitch, tar, reſin, *&c.* and, as for precious ſtones, ambergriſe, pearl-fiſheries, ſilver-mines, gold-mines, and the like, it is much better to leave the *Spaniards* to ſearch for them; ſeeing the produce of their labour, by ſupplying them with the neceſſaries of life in the way of trade, muſt ultimately tend to enrich *ourſelves*.——Nor may it be amiſs always to remember, with thankfulneſs, that, where Nature has denied mines, ſhe generally gives a deep rich ſoil, which affords more uſeful wealth to the induſtrious cultivator. It was in a rocky barren tract of land, with here and there ſome ſickly herbs, thinly diſperſed (as on the mountains of *Potoſi*) where *Ovid* tells

us, that *Oreades*, after a long purſuit, is reported to have found the *demon*, *Famine*:

Devenit in Scythiam, rigidique cacumina montis;
(Caucaſon appellant.)
Quæſitamque Famem *lapidoſo* vidit in agro,
Unguibus & *raras* vellentem dentibus herbas.
MET. viii. v. 800.

I will now return to ſome improvements of huſbandry in the *European* methods of culture, and here I will firſt mention the cultivation of the *larch-tree* (or *larix deciduis foliis*) concerning which it is reported, by authors of reputation, in this, the laſt, and the preceding century, that old larch-timber is, as it were, impenetrable to the ſtrokes of an ax: Others aſſert, that, if it be buried 3 months in the drain, or ſink of a dunghil, and then ſteeped in a river 3 months more, it will become hard like ſtone, and reſiſt putrefaction for many ages: But (allowing for ſome little hyperbole in theſe caſes) thus much ſeems certain: No timber will prove more uſeful for ſhip-building, in part, at leaſt, if not in the whole; [e] and no common wood, in foreign

[e] We have ſpoken with this precaution, becauſe the ingenious author of the Treatiſe *ſur la Diſette des Bois*, publiſhed five years ago at *Zurich*, remarks, that very large beams of this wood, in caſe they are not thoroughly ſeaſoned, are apt to warp, after being hewn and ſquared; which ſeems, at firſt ſight, to diſagree with what will be ſaid about picture-boards, *&c.* but this, in my opinion, implies no contradiction in the two aſſertors, as it is natural enough to think, that large beams will be more difficult to dry than planks, boards, or ſmaller pieces of timber.

Virgil and *Horace* probably meant the larch-tree, when they ſaid,

——— *Dat utile lignum*
Navigiis pinus.———
Quamvis pontica pinus,
Sylvæ filia nobilis.

And,

A Branch of the LARCH-TREE.

Th. Richeli delin. W. Hibbert sculp.

reign countries, bears an higher price than that of the larch-tree. It has likewise (besides its durableness) another most valuable quality in house-building: Which is, that no timber is so unapt to take fire, or consumes so unwillingly; insomuch that there is some difficulty to burn a large cleft of it, even on the hearth. [f]

Mr. *Miller*, than whom few writers are more cautious and accurate, or have taken greater pains, seems to doubt this fact, from the apparent improbability that a resinous wood should be unapt to take fire: And, indeed, it seems to be a just and sensible query; nor can I satisfy his doubt from my own observation; for, though I have lived a considerable time in countries where this wood is common, yet, as the inhabitants use neither hearth or grates (but stoves only, where the fire is concealed) I happened not to make any remarks on the subject. But *Matthioli* (first physician to *Ferdinand*, archduke of *Austria*, and king of the *Romans* in 1554)

And, for the same reason, the conquerors, at the *Isthmian* games, were crowned with pine-branches as a *maritime honour*.

A modern classic speaks of the larch-tree as follows:

Non *illam* immerito colit, & sibi vindicat unam
Neptunus, plantarum aliàs non magnus amator;
Illa solo stabili, & natali colle relicto,
(Quo ventosa diu jactato vertice bella
Præluſit juvenis) montes habitare marinos
Gaudet, & æquoreis occurrere nuda procellis:
O frustra generi plantarum hominumque negatas,
Discluſasque solo, & donatas piscibus undas!
Naturæ superant *ars* atque *industria* leges,
Arboribusque virisque fit altera patria pontus.

Couleius de Plant. l. v.

[f] There are other sorts of wood, which are, to a certain degree, incombustible, or, to speak more properly, very unwilling to take fire. Thus I am assured, from good authority, that the timber of the sassafras-tree cannot be burned alone, but some other wood must be mixed with it.

who lived at *Gratz* in *Stiria*, obſerves to this effect, in a country where there are abundance of iron-works, and conſequently a great conſumption of fewel. His words are theſe:

" Unwilling as this wood may be to take fire, " yet it is no-ways difficult to burn it in kilns, " glaſs-houſes, and furnaces belonging to iron-" works, when once the inſide of theſe recepta-" cles is rendered intenſely hot. Such is the prac-" tice in the iron-works of Stiria and the biſhop-" ric of Trent, where this wood is of ſingular uſe, " when there is heat ſufficiently fierce and ſtrong " to penetrate it forcibly [a]."—And here it might appear incredible to the reader, if one were to tell him (on pretty good authority received from natives of thoſe countries) how long a lump of larch-wood, thoroughly red-hot, and taken out of theſe furnaces, may be kept alive, if it be covered cloſely with embers and aſhes.

Yet ſtill from appearances, as well as common probability, I am inclined to favour Mr. *Miller*'s opinion, which ſeems to be ſtrengthened by M. *du Hamel*, who tells us from accounts tranſmitted to him, " That the reſinous ſubſtance in larch-trees " is looked upon to be very combuſtible; and " therefore there is a public order in the diſtrict " near *Briancon*, that houſes built with ſuch tim-" ber ſhould never join, but ſtand at a certain " diſtance [b].

" Houſes built with this timber," continues he, " look quite white at firſt, but, in two or three " years, the outſide turns black like charcoal, " whilſt all the joints and chinks are cloſed with " reſin extracted from the pores of the wood by " the ſun's heat; which reſin forms a kind of var-" niſh

[a] Comment. in *Dioſcorid.*

[b] *Traite des Arbres & Arbuſtes qui ſe cultivent en pleine Terre*, tom. I. 4°. p. 336.

" niſh hardened by the air, and of a bright poliſh
" no-ways unpleaſing to the eye.

" This exſudation, conſidered as a glue, binds
" together the frame-work of houſes, and enables
" them to reſiſt the violence of winds; whilſt, in
" the mean time, as a varniſh, it becomes imper-
" vious to rains, which ſlide off immediately
" from it."

Experience alone can lead us to adopt the true opinion.

Many palaces are built at Venice and in other parts of Italy with this timber; but under water it almoſt petrifies, and is capable of ſupporting a ſurpriſing weight. It is alſo of ſingular uſe in ſtrengthening the wooden frame-work of bridges, or, where there is occaſion, to mortiſe wood into walls or earth.

Upon this wood *Raphael* and other eminent maſters choſe to paint their pictures; for, beſides being extremely ſolid, it admits a fine poliſh, or firm ſmoothneſs, which contributes to throw forth the colouring with uncommon luſtre:

———*Annis non expugnabile lignum:*
Illuſtrat pictoris opus.———

It is likewiſe thought to be inacceſſible to the attacks of worms. On theſe accounts, as well as not being liable to warp when ſawn and well ſeaſoned, the modern *Italians* uſe it for back-boards to place behind fine drawings, when they frame and glaſs them; as alſo for picture-frames, table-frames, &c. becauſe no other wood gives gilding ſuch force, brightneſs, and, as it were, a ſort of natural burniſhing; and this is the main ſecret why *Italian* gilding on wood is ſo greatly preferable to ours, which has often a tarniſhed ſpongy caſt, and looks like gilt gingerbread. And again, if my

memory deceives me not greatly, the *Italians* prefer it before all ſorts of wood for making the wheels of poſt-chaiſes, &c. as being very durable and unapt to crack.—No boards make better wainſcoting, or take paint better: Not to mention (if that circumſtance be true) their natural ſecurity againſt fire.—No wood affords ſuch durable pipe-ſtaves for caſks, which, at the ſame time, preſerve the good taſte of wine to admiration.

In the country of the *Griſons* [f], the inhabitants make ſhingles [g] of this timber, which laſt from generation to generation. This application of it in our kingdom would be invaluable, for covering barns and other ordinary out-houſes. The very look of it would be beautiful and huſbandman-like; for the roof would lie ſmooth and regular, generally ſpeaking. Neither rains would rot it, nor winds ruffle it, nor might it be apt to catch fire. Whereas thatch is always liable to theſe accidents, and, though it be cheap at firſt, is dearer in the long-run than tiling or ſlating [h], being for ever in diſorder, and repaired in unſightly patches: Not to mention its harbouring ſparrows, hurtful inſects, and being continually covered in the inſide with cobwebs, duſt, and all ſorts of foulneſs, to the great detriment of corn and hay.

Nor is the larch-tree without its medicinal uſes. The beſt ſort of agaric is gathered from its bark; and the ſame bark, upon inciſion made, yields the pureſt *Venetian* turpentine.

It is a farther advantage, that, this excellent tree diſlikes a rich, moiſt ſoil, and thrives beſt in ſuch

[f] *Diſette de Bois*, à Zurich, 1761. p. 160.

[g] Shingles are boards uſed in the manner of tiling: Thoſe of the *Griſons*, I am informed, are nailed down to the rafters, being half an inch thick, and the ſuperficies one foot ſquare.

[h] In a part of *England*, where high winds are frequent, I have known the thatch of a ſmall farm and out-houſes coſt the landlord, at an average, 40*l.* in twenty years.

ſuch poor lands as may be eaſily and profitably ſpared for plantations; namely, cold, meagre, gravelly, or ſtony lands, provided the roots can find depth to penetrate downwards. It grows ſlowly the firſt four years; but, in twenty years, will exceed a fir-tree, in girth and height, that is doubly older.—A plantation of 100,000 larch-trees was raiſed lately in a little diſtrict of *Germany* called *Wernigerode*.—Nor is there any reaſon for doubting, that this tree will not thrive to admiration in *England*; for ſome of them, about forty years ago, came to full ſize and perfection near *Chelmsford* in *Eſſex*: And Mr. *Miller* mentions others of a conſiderable growth at *Wimbleton* in *Surry*, which produced a large quantity of cones every year.

What obſtructs the removal or tranſplanting of young larches, about three years old, is the violent force of the ſun's heat in ſome countries: But, with us, in this temperate climate, there is not much to fear in that reſpect, provided we proceed with common caution: For no plants are more impatient of the ſun's heat; and of courſe thrive even upon the *Apennine* mountains, where they multiply themſelves into foreſts by the falling of their cones.—Of courſe, ſome adviſe us to bury a whole cone at a depth of three inches, and not ſow ſingle ſeeds. The ſame perſons alſo obſerve, That, when an old larch-tree rots almoſt to the ground, the fineſt, healthy, young plants ſpring from the ſtumps. But this is related on the authority of others.

To which may be added, That the branches of the *larch* afford a thick pleaſing ſhade: The whole tree, when alive and growing, ſmells odoriferous; and even the timber has an agreeable ſcent, when felled, ſawn, and applied to domeſtic uſes. The leaves, in ſpring, are of the moſt lively verdure that one can behold. The flowers are male and

female. The former are a sort of catkins; the latter are not only singular, but beautiful, being of a purple-violet colour. The cones are finely tinged with purple, and have almost as pleasing an effect as the flowers.—The colour of the wood seems to depend on the age of the trees.

Lastly, It is commonly said, that the larch-tree differs from the pine in this respect, that, when the new leaf comes out, the old one is thrust off.—Those, who are desirous to procure the kernels for seed from the bishopric of *Trent*, or the duchies of *Stiria*, *Carinthia*, and *Carniola*, would do best to enquire for the tree under the name of *larga*, and not *lariche*. It is best to have the seeds brought from abroad (without the cones) in winter: For heat dissolves the resin, and hurts the future vegetation of the seeds or kernels. *M. du Hamel* mentions another way of saving them for sowing [n].

The larch is the only tree, of the resinous kind, that can bear the severity of winter *without its leaves*. Therefore care must be taken not to plant it with clumps of ever-greens.—An healthy larch will afford, for thirty or forty years, seven or eight pounds of resin at each time of boring; which may be once a year: But trees that have been thus wounded from time to time, are held in no esteem by the architect or carpenter.

The bark of the young trees is used by tanners.

Lastly, the cedar of *Libanus*, one of the largest of all trees, is an *ever-green* larch-tree. It sometimes extends its branches eighteen feet horizontally, and forms so thick a covering, that one can hardly see to read a book of small print under its shade.

In the same view may be considered a species of *Juniper-tree* in the *Antillas*, which *Linnæus* and *du Hamel*

[n] Traité des Arbres, &c. tom. I. 4°. p. 333.

Hamel look upon to be a larch or cedar. It is one of the largeſt and talleſt trees in thoſe parts of the world. The planks are of a mahogany-colour, cloſe-grained, firm, odoriferous, and excellent for wainſcoting and cabinet-work.

I have been aſſured alſo, that the *red pine* of *Labradore* is as good wood as any the world affords for building ſhips. The *French* have long known this ſecret, and ſave the out-going of much money to *Ruſſia* and *Norway*, as they can procure the ſaid timber upon eaſier terms.

The rope-oſier of *America*, if it could be brought to thrive in ſome of our colonies, might have its uſes. The beſt account of it is to be found in the *Voyage down the river of the Amazons*, publiſhed at *Paris* in the year 1747 [p].

As

[p] "The plants, which draw the attention of moſt new comers, ſays he, by their ſingularity, are the *lianes*, or a kind of oſiers, which ſerve inſtead of ropes, and wherewith *America* abounds in all the hot and woody countries near rivers. They have this property in common to them all: That they grow up winding round the trees and ſhrubs they meet, and, being arrived at a very great height, ſhoot out threads or filaments, which falling down, in a perpendicular line, work themſelves into the earth, take root afreſh, grow up again, aſcending and deſcending alternately. Meanwhile others, being carried obliquely by the wind, or by ſome chance, faſten frequently upon neighbouring trees, and form a confuſion of cordage, hanging down, and extending every way; which yields the eye a proſpect very like that of a ſhip's tackling. There are hardly any of theſe *lianes* which have not ſome particular quality aſcribed to them: Some of which have been very well confirmed, as is that of the ipecacuana. I have myſelf ſeen in ſeveral places one kind, which emits a very ſtrong ſmell, plainly reſembling that of garlic, and of courſe eaſily known. There are ſome as large as a man's arm; ſome choak the tree round which they cling, and make it actually die away, by winding themſelves ſo hard about it; which has cauſed the *Spaniards* to call this plant *metapalo*, or wood-killer. Sometimes it happens, that the tree withers away, rots, and waſtes, as it ſtands; ſo that there remains only the arabaſque fret-work of the *lianes*, which forms a kind of wreathed column, ſelf-ſupported, and tranſpierced through and through, which art would find it very difficult to imitate."

As the introduction of a true ſpirit and right uſe of agriculture into our colonies (thoſe of our new acquiſitions in *Canada* and *Florida* particularly) may be of ſingular uſe, firſt to the coloniſts themſelves, and then to the parent-country from whence they migrated, I am in hopes the reader will be prevailed upon to excuſe the detail I have given, not only from the importance of the ſubject, but likewiſe from its novelty. I have, at leaſt, in this excurſion, the excuſe of *Lucretius* to plead:

——*Juvatque novos decerpere flores.*

And now it may be high time to think of returning to my native country.

We are not ſo careful in our own country, as perhaps we ought to be, in *chuſing*, *ſowing*, *and diverſifying graſs-ſeeds*; nor in cutting hay at ſeaſonable times, and curing it well. *North-America* alone produces abundance of graſſes, which might afford cheap as well as plentiful ſuſtenance for cattle; but we are not ſufficiently inſtructed in the nature, qualities, and culture of theſe vegetables: And indeed, in the preſent and all ſimilar caſes, we ſeem to want courage and perſeverance; for one miſcarriage (however injudiciouſly the attempt was conducted) is cauſe ſufficient for diſheartening a whole country at leaſt for a century. What *did not grow*, and what *cannot* grow, are terms convertible in the mouths of the *great* vulgar and the *ſmall*.

Therefore, to advance agriculture to any notable degree of improvement, better heads and better hands muſt co-operate with thoſe of the farmer and common cultivator. But, whenever *theſe latter* exert that induſtry, and attain that knowledge, together with ſuch a tractable diſpoſition and deſire of excelling, as even the *gardener* poſſeſſes (who is a man

man no more enlightened originally than themselves) then husbandry will arise to a greater degree of perfection. And if (according to the idea of a wise prince in *Germany* about a century ago [g]) a little book was composed, containing the plain solid inconteſtable foundations of husbandry (to which prints cut on wood might be added, by way of catching the attention) and poor men's children were obliged to read it over to their masters and mistresses in country-schools, something of a ground-work might be laid, in order to guard them against habitudes and prejudices, whilst, at the same time, the mind would be set to work its searching after truth, and acquiring knowledge; for many a great genius in husbandry, without knowing his own powers, lives and dies in a poor cottage [h]. Perhaps this scheme may be best realized in *Ireland*, where proteſtant-charity schools are frequent, as well as large, and under a very exact and careful regulation. Besides, it is in the power of the governors of *such* schools to give orders, that such a book should be read by the young people. Happy shall I think myself, if the present hint may prove of any the least use to that nation.

Lord *Molesworth* has left us a slight sketch of his thoughts upon this subject; and as the pamphlet [i], which contains the passage, is become scarce (and the rather, as it was printed in *Ireland)* I shall just give an extract from it:

"As

[g] "E souverain" (says a judicious anonymous writer) "vrayment grand homme par ses virtus civiles, changea par ce moyen tout à fois la face des ses etats."

[h] Two very useful tracts of a different nature might be recommended to these schools; the one is Archdeacon *Welshman's Husbandman's Manual*, pr. 2d. and the other is Dr. *Hildrop's Husbandman's Spiritual Companion*, pr. 1s. both which pamphlets seem to be copied from a treatise of *Flavell's*.

[i] *Some Considerations for the Promoting of Agriculture and Employing the Poor*, 4°. Dubl. 1723.

" As to agriculture, I ſhould humbly propoſe, " that the *School for Huſbandry* were erected in every " county, wherein an expert maſter of the methods " of agriculture ſhould teach, at a fixed yearly ſa- " lary; and that *Tuſſer*'s [n] old book of huſbandry " ſhould be taught to the boys, to read, to copy, " and get it by heart; to which end it might be re- " printed and diſtributed.—I doubt not but ſome " ſuch method as this would make huſbandmen, " and prevent the increaſe of the poor."

Schools for poor folks children are eſtabliſhed on an excellent footing in ſome parts of *Germany* and *Holland*. The children work one part of the day, and read and write the other part of the day interchangeably, in ſuch proportions as the governors, maſters, and miſtreſſes think proper. In conſequence of this, that worthy citizen *Thomas Firmin* (the friend of *Tillotſon*) aſſures us, that the children of *Norwich*, in the time of *Charles* II, from the 6th to the 10th years of their age, earned 12000 *l.* a year more than ſupplied them with food and raiment, merely by knitting fine jerſey-ſtockings [o]. And thus children, at *Nuremberg*, make toys for *Engliſh* children of the ſame age to play with.

Under this article ſomething may be remarked, in regard to the education of rich men's children, as well as thoſe belonging to poor men. *Cowley* wiſhed to ſee a college founded, in each of our univerſities,

[n] *Tuſſer*'s book is written in *quatrains*, or ſtanzas of four verſes each. Lord *Moleſworth*'s idea is a good one; but the poem is very obſolete, and of courſe too hard to be underſtood by children, or even grown perſons, being publiſhed before the year 1577. Some may think it too long; for it contains more verſes than *Virgil*'s Georgics.

[o] *Some Propoſals for Employing the Poor*, 4°. 1681, p. 3. I would recommend this ſcarce valuable treatiſe to all lovers of national œconomy. Hence aroſe the idea of pariſh work-houſes.

univerſities, for promoting the knowledge of agriculture[a]; and perhaps that wiſh was formed upon reaſonable expectances of ſome ſucceſs: For, according to the beſt of many men's obſervations upon the ſubject, the proper time to infuſe that uſeful part of natural philoſophy, called huſbandry, is in the earlier ſtage of life, when there is curioſity and impatience after knowledge. And, if practice here could be joined with theory, amuſement in the fields, enjoying the open air, exerciſe, and activity agree well with the turn and caſt of young people; not to mention a revolution of perpetual variety, which is very engaging at their age.

On the contrary (for I am only reciting here the opinions of others) one of the beſt judges of agriculture now in *Europe* has obſerved to me, "That "little ſocieties, eſtabliſhed in different provinces "or counties of the ſame kingdom, being ſettled "at a conſiderable diſtance from each other, and "placed ſo as to comprehend the whole kingdom "in particular diſtricts, with one or more general "directors, *who ſhould be obliged to publiſh every "year the reſult of the ſeveral improvements and ex-"periments*, would be infinitely better than read-"ing ſpeculative lectures, as is the cuſtom in "ſome foreign univerſities."

It is one point gained, without doubt, to be enabled to read the huſbandry works of *Cato*, *Varro*, *Virgil*, and *Columella*, with taſte and knowledge. It may open a new walk on claſſical ground; and in all probability give young men certain pre-diſpoſitions in favour of agriculture: Yet ſtill the whole, combined together, will produce but ſlight effects, except we call in the aſſiſtances of practice and experience.

Something, in one ſhape or other, ought certainly to be done, and the complaint of *Columella* ſhould

[a] Eſſays.

ſhould be removed, if poſſible ; who ſays with ſome degree of warmth, *Agricolationis doctores qui ſe profiterentur, neque diſcipulos cognovi.*

The ſociety for promoting agriculture, lately eſtabliſhed at *Berne*, ſeems to me to be the beſt contrived for anſwering its intentions of any ſociety of the like nature in *Europe*. The *Dublin* ſociety, though founded on a narrower baſis, both as to objects and correſpondents, deſerves to be ſpoken of with great eſteem. That of *Tuſcany* has its merit, provided the Tranſactions of it were publiſhed periodically.—*France* has done much, but not enough to content thoſe of her patriotic ſubjects who conſider agriculture in a commercial light. And hence it is, that one of her writers obſerves, (whether truly or falſely I ſhall not take on me to determine) " That the miniſtry has not had the " good fortune, for a century paſt, to underſtand " ſome very material maxims of adminiſtration ; " and that the modern *French*, like the old *Gauls* " at *Rome*, ſeem to have been deficient in their " political arithmetic."

The reſpectable patriots in *England*, that form the *Society for Encouraging uſeful Arts*, ſeem determined (to their honour be it ſpoken) to contribute all that lies in their power towards the advancement of agriculture. Such munificence and attention to public proſperity may be called truly royal, as it would caſt a luſtre even on the greateſt kings and emperors. Nay, ſo extenſive is the generoſity of the perſons here mentioned, that, in all probability, they would beſtow more premiums in matters of huſbandry, if new and proper objects of culture ſhould be ſuggeſted to them ; which appears from the propoſals to the public this preſent year, where, amongſt other things, they have excited all lovers of huſbandry to make experiments on *lucerne*, and three or four other ſorts of vegetable food, for the

better

better support of cattle. Nor is it to be doubted (for this I speak partly from the success of my own experiments) but that various new useful attempts remain still to be made upon fifty plants and upwards for the like purposes [b]; many of which are natives of our own island, and others may be introduced amongst us from abroad with little hazard; not to mention the varieties of sorts under the same generical name: As for example in *trefoils*.

But, in truth, societies ought to be established for promoting the well-being of agriculture *only*; since *that* art alone will *demand* the whole attention of a considerable number of sensible persons; whilst, at the same time, experience and matter of fact are the only safe and useful groundwork upon which they can proceed.

In conjunction with these assistances, the natural philosopher, the mechanist, and the man of fortune (who can best bear the hazards of an experiment) must all join with the laborious husbandman, in order to advance the art of agriculture. For what improvements can reasonably be expected from a poor uninstructed farmer, who cannot wait for *eventual* gains, however probable; but thinks only of paying his annual rent and acquiring a sustenance from day to day; plodding on slowly and heavily in the beaten track of his ancestors and neighbours, like a beast of burthen, overladen and disconsolate!

——— *Qui solus avita*
Gramina, communemque petit defendere campum [c].

—Men rarely cultivate an estate well, or even according to the best of their capacity, except they are invested with the property of it, or enjoy a tenure

[b] See Postscript.
[c] *Statii* Theb. l. iv. v. 403.

nure of ſome duration in it. Encouragements therefore, for induſtrious and careful tenants, ſhould be thought of by landlords. Rack-renting hurts the proprietor of the land ſometimes immediately, and always remotely; ſo that a *ſhrewd* farmer, in many caſes, as things now ſtand, gets more by continually harraſſing the ground, than by giving it the aſſiſtances of repoſe and manures; he gains by *deſolation*, and loſes by *improvements*.[d]

It were to be wiſhed therefore, that ſome ſcheme could be hit upon (not much unlike the *Flemiſh* one formerly mentioned) of rendering lands advantageous to the proprietor and tenant; ſince, otherwiſe, when the latter has brought one farm into a downright conſumption, he flies from thence, and plays the vampyre upon a new one. In this caſe, the earth, like a tender child, often loſes by changing her nurſe.

So that, to reſume the point juſt before touched upon, when taxes are multipliable on the produce of land, or increaſe of live-ſtock, as in *France*, *Italy*, and the hereditary dominions of the houſe of *Auſtria*; or where the landlord is rigid in raiſing his rent upon every new improvement, as ſometimes happens in *England*; there it is prudent, in the farmer, not to make ſhew of gaining much wealth, but,

[d] In ſome parts of *England*, the inhabitants have a ſtrange old proverb upon this occaſion:

He that havocks *may ſit*,
He that improves *muſt flit*:

Or, in other words, the tenant that *racks* the land, may continue in the farm till he has worn out the ſoil: But he that improves the eſtate, muſt pay an advanced rent, or be obliged to quit.

In *Italy*, when the huſbandman's time of holding is almoſt expired, it is his cuſtom to ruin the vineyard he rents, by forcing the trees to bear till they become barren. Such treatment is called, by the neighbourhood, *Laſcia podera*, or *adieu farm*.

but, on the contrary, appear to be poor. And, alas! too often,

Pauper videri vult Cinna, & eſt pauper.

Thus have I given a ſlight ſketch of the preſent ſtate of huſbandry, both at home and abroad, which may be matter of ſome little inſtruction and amuſement.—Of many other actual as well as poſſible improvements a fuller notice may be taken, hereafter, by myſelf and others.—Once more, therefore, it is to be hoped, that our *beloved country* may always continue to take the lead in matters of agriculture, and that a time will come, when we ſhall not only make conqueſts abroad, but over our own ſoil.

The grand ſecret of managing an induſtrious flouriſhing ſtate is to harmonize agriculture, commerce, and manufactures; giving to each fair ſcope and attention, and never exalting one to the *manifeſt detriment* of the other. The prince that ſhines in theſe reſpects will do an honour to human nature, and his reign will be remembered by poſterity, like that of another *Titus!* A moſt illuſtrious ſovereign made this remark from his own experience: *The king's favour* in matters of agriculture, *is as dew upon the graſs.*[h]

In the ages of true greatneſs and ſimplicity, the culture of the earth, and *that* of the ſtate, always proceeded hand in hand. Many centuries afterwards, ſkilful perſons were ſent, at the expence of the public, to explore the vegetables of diſtant countries, and rewarded with due honours, when they returned home. In ſome public triumphs at *Rome*, the new-diſcovered fruits and plants were carried in the cloſe of the proceſſion. And, when the *Romans* ſubdued *Carthage*, they made a preſent of all the libraries they found there to their allies,

[h] *Prov.* xix. 12.

excepting only the husbandry-writings of *Mago*, which consisted of two and thirty treatises, and which, by order of the state, were translated into *Latin*.

Several plants took their names from great and illustrious personages, who first discovered their uses and virtues. As *gentian*, from a king of *Illyria*; *lysimachia*, [a] from a *Macedonian* prince; *circæa*, [b] from *Circe*, the daughter of the sun; and *mithridatia*, from *Mithridates*, king of *Pontus*. I might also mention the *eupatorium*, [c] the *artemisia*, [d] the *euphorbium*, [e] *helenium*, [f] and twenty others. Nor need we take notice, that several illustrious *Roman* families took their names from words used in agriculture.

It were to be wished, that the same ambition continued fashionable at present, and that ingenious and industrious moderns would turn their thoughts once more to the study of plants, not only as matter of food, *&c.* for men and cattle, but in a medicinal sense: Since the simple physic of vegetables appears to many to be the physic reached out unto us by the hand of our great Creator and Preserver: And therefore (says *Linnæus*) "tho' the learning of *Galen* and *Dioscorides* may have done much, the no-learning of the *Indian* savage has done more." For, though the *former* hunted nature at large, like high-ranging spaniels, yet the *latter* followed the scent slowly and patiently, close to the ground.

Thus much I have thought proper to advance in favour of husbandry, and every other branch of rural

[a] *Lose-strife.*
[b] *Enchanter's night-shade.*
[c] *Agrimony.*
[d] *Mug-wort.*
[e] *Gum-thistle.*
[f] *Elicampane.*

ral œconomics; but my encomiums shall be restrained within due bounds: *Pessimum genus inimicorum Laudantes*, says *Tacitus*; and *Virgil*, on this account, desired to wear a chaplet of *baccharis*, by way of preservative against those *qui ultra placitum laudârint*.[a]

For, if *agriculture* be represented as supplying every thing, then *commerce* and *manufactures* must decline. Again, if the *two latter* become the public passion, the dearness of living, joined with a neglect of *husbandry*, may frustrate our expectancies, and mens minds will be too much turned towards ambitious delusions. Nor can much be expected from any country where *avarice* is the *main* motive of action,[b] and where not *money's worth*, but *ready money* must be had immediately, and in great abundance.—It is an heavy misfortune, when men want to grow rich too soon, and acquire great wealth, not *progressively*, but *per saltum*.[c] These are visions conceived in the groves of *Utopia*, or on the banks of the *Missisippi*.——*Spain* laboured under the same delirium, as soon as she took possession of the *West-Indies*. Examine what she *was*: Reflect on what she *is*: And then *draw the conclusion*.[d]

An *English* writer, of some eminence, perceived these mistaken notions in the *Spaniards*, above a century ago.

"The riches of *Spain*," says he, "are much increased, but it is disputable, whether that circumstance

[a] At si ultra placitum laudârint, bacchare frontem
Cingito, ne noceat vati mala lingua futuro.

[b] Nimirum alii subiêre ritus: Circáque alia mentes hominum detinentur, & Avaritiæ tantum artes coluntur.
Plinii *Hist. Nat.* l. xiv. *in Proëm.*

[c] See note, pag. 29.

[d] It is remarked by *Montesquieu*, "That it is happy for all trading powers, that God has permitted the *Spaniards*, *Turks*, and *Portuguese*, to be in the world; for, of all nations, they are the most proper to enjoy large tracts of country with insignificance." *Hist. de la Decadence*, tom. II. p. 206.

ſtance will turn out to her greater damage or advantage.—The people of that kingdom are ſo very much exhauſted already, that the *poſſeſſion of it is not now kept without great difficulty*, and yet the conſumption goes on daily; and, were the paſſage to the *Indies* a little more open and cheap, many more would paſs thither, and *Spain would fall under the ſword of the next invader*, for want of hands to defend it.

"Nor is *Spain* conſideraby enriched by theſe treaſures of *America*, they being yearly drawn out again by the neighbour-nations who ſupply *Spain* with neceſſaries.

"The depopulation of *Spain* is moſtly attributed to the baniſhment of the *Moors* and their wars abroad, and *theſe* have had their ſhare in it; but the *American* plantations ſeem to have been the principal cauſe.—But, however this depopulation came upon *Spain* at firſt, nothing is more certain, than that *America* has much increaſed it; ſo that, as far as a man may judge of future things, the poſſeſſion of this country will *paſs, in a few generations, to another people*," (quere, if not the *French*) "or, at leaſt, will become an acceſſion to ſome other crown."[e]

The author then continues to obſerve, with great good ſenſe, that, in proportion as trade and migrations increaſe, care, at leaſt, ſhould be taken to cauſe population to increaſe: So that, for example, if manufactures, *&c.* were augmented one third, the number of ſubjects, likewiſe, ſhould be augmented one third; "otherwiſe," ſays he, "the de-

[e] "What chiefly ruined *Spain*, after its acquiſitions in *America*, was plunging the crown ſo deeply, ſays an old author, in the gulphs of brokers and money-changers: So that moſt of the revenues of it ſtand engaged for payment to this very day. *Raleigh's Epilogue.*

deluſion is a very wonderful one, and may be underſtood, when it is a little more felt." [f]

It was a query propoſed to this nation, in the reign of *James* I, "whether our colonies had not diſpeopled us viſibly, and thrown a damp upon the culture of the earth? *England*, ſays my author, began its plantations near an hundred years after *Spain*, and, conſequently, the effects thereof are not yet ſo viſible as in the other kingdom. But our inhabitants are ſenſibly waſted already, and it has a very ill effect upon our tillage and huſbandry in all the ſouthern parts of the iſland.—So that, as the *trade* of *England grows* by the plantations, the *lands* of *England fall*; the gentry and nobility ſink, and the *ſecurity* and ſtrength of the kingdom abateth."

Certain it is, that the dearneſs of proviſions and expenſive manner of living in *England* raiſe the price of our workmanſhip very conſiderably, tho', at the ſame time, all foreigners agree, that the work is neatly executed;—that it is more durable, and well worth the increaſe of price, if the inhabitants of poorer countries could afford to give it.

"What foreign manufactures want," ſay foreigners, "in ſolidity and goodneſs of materials, *&c.* they make amends for by taſte, fancy, and a ſucceſſion of variety; not to mention that moſt people chuſe to buy *two* things of the ſame ſort inſtead of *one*, if the *former* can be purchaſed at or near the ſame price as the *latter*:" Beſides (continue they) "we indulge our caprice with novelty, and keep pace with the faſhion:"—(Now faſhion, by the way, is nothing more or leſs than an oſtentation of ſplendor, and that with as much and ſudden variety as poſſible.—) However, all theſe arguments carry their weight and influence with nine-tenths of mankind, though they may not be ſufficient to convince a philoſopher!

[f] *Heylin's Coſmography*, p. 941.

There is no diſpute but that our commerce and manufacturies have made glorious advances within theſe forty years; but has population attended them *æquis paſſibus ?*—If this be not the caſe, do we not ſeem to fall under *Heylin*'s predicament ? Since it rarely happens, that induſtry, frugality, temperance, and increaſe of health, are the attendants of new and great acquiſitions in riches. But, if God ſhould be pleaſed to beſtow the true ſpirit of moderation and humility upon any people, then increaſe of ſubjects and numberleſs other bleſſings would enſue of courſe.—Yet, on the other hand, it is much to be feared, notwithſtanding all our vaſt augmentation of trade, that the culture of the field is too much neglected, and that our populouſneſs diminiſhes rather than increaſes.

This is plain, without appealing to regiſters and calculations, though the fact, from them, could be made clear, beyond contradiction. Nor need we have recourſe to the accidents of war, or the number of lives that muſt be loſt in an extenſive navigation: Theſe are ſmall partial conſiderations, and, at the ſame time, unavoidable. It may ſuffice to obſerve, that an increaſe of luxury, in rich and poor, together, with an unlimited abuſe of ſpirituous liquors and tea, in the common people, are, of themſelves, ſufficient to produce the depopulation here complained of.

I have been well aſſured, by one of the moſt experienced practical judges of trade in *England*, *that as much ſuperfluous money is expended on* TEA, SUGAR, *&c. as would maintain* 4 *millions more of ſubjects in* BREAD.

The calculation given to me was a very moderate one, the tea being only charged at 5*s.* a pound, and the ſugar at 7*d.*

One million of pounds of tea, at leaſt (not including contraband-tea) is drank annually in *Eng-*

land, and 8 millions of pounds of ſugar are conſumed with it.

We may add further, that the money, ſent abroad for tea, is buried in a gulph from whence it never returns: [g] Nor is the whole body of the *Engliſh* nation advantaged by this intercourſe of trade, but only a certain number of individuals. A tax, therefore, on ſuch *oriental luxury*, if the expreſſion may be uſed (with proviſo it relieved the poor from the burthen of ſome other impoſt upon the immediate neceſſaries of life) might be called, in effect, a tax founded upon moral prudence and parental kindneſs!

But to reſume the point I was before treating of.

Though trade, commerce, and manufacturies cannot be too great in a frugal induſtrious people, (for ſociety muſt always have this proviſo in view) yet, at the ſame time, care muſt be taken to ſupply a ſufficient ſucceſſion of hands, and proportionable attention ought to be given to agriculture, for food muſt be found for artizans and manufactures, ſince men cannot feed on gold, but bread.—Nay, what is ſtill more, proviſions muſt be ſupplied in ſuch plenty, that other nations may not purchaſe the ſame common neceſſaries upon *much* eaſier terms: For, if that be the caſe, they will underſel us in foreign markets.—Our goods, therefore, ſhould be better than theirs, but not in an extraordinary proportion; for then it will be difficult to find purchaſers.

[g] "The merchant," ſays *Locke*, "may get by a trade, like that to the *Eaſt-Indians*, which makes a nation poor."

Trade with the *Eaſt-Indians*, as far back as the times of the *Romans*, has ever been matter of diſadvantage to the party trading with them; for we carry ſpecie thither, and bring none in return. Commerce with the *Africans* is upon a different footing: The natives ſet an high value upon *European* trifles, and every civilized ſtate that traffics with them, receives an high price in return.

Wealth, acquired by trade (and trade naturally calls for application and attention) is of ten times a more permanent nature, than wealth raiſed ſuddenly from mines of gold and ſilver, *&c.* or beds of diamonds. But the ſame, or a ſmaller ſtock of riches, procured by the means of agriculture, is ſtill more durable to the acquirer as well as more advantageous to ſociety; firſt, becauſe it is more ſlowly and painfully earned; and, ſecondly, as it is matter of home-production; whilſt many of the materials the manufacturer and artiſt employ their ſkill upon, are firſt purchaſed from other countries, which diminiſhes the nett national profit.

Generally ſpeaking, where mines are found, the land is poor and barren; *which ſeems to be a leſſon from Providence.* To which may be added, that a ſudden great influx of wealth creates new imaginary wants; and matters of falſe elegance, luxury, and ſuperfluity, muſt be ſought for and imported from other nations, which, in effect, makes foreigners, more or leſs, proprietors of the mine. For which reaſon, the wiſe policy of the *Chineſe* takes care that the ſubterraneous riches of their country ſhould remain quiet and undiſturbed in the bowels of the earth; and this is the ſecret which raiſes their agriculture and trade to an high pitch of perfection.

Upon theſe accounts, I would, in the gentleſt and modeſteſt manner, admoniſh my countrymen to check their impatient deſires a little, in wiſhing to be maſters of *Peru*, *Chili*, or *Mexico*, in this conquering age. Indeed, it can never be denied, but that the acquiſitions of *Spain* were very great, for a ſmall number of years after ſhe firſt diſcovered *America.* But, at the ſame time, the conquerors did not conſider that there is an *interior* and *phyſical defect* in *ſuch* riches, which loſe a part of their value, in proportion as they are multiplied; and this appears from the augmentation naturally cauſed in

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the price of provisions, *&c.* "As the specie of *Europe* soon doubled," says the Baron *de Montesquieu*, "the profit of *Spain* became by one half less valuable, as the mines yielded about the same quantity of wealth every year.

"In double the time the specie still doubled, and the profit still diminished another half.

"It diminished even more than an half, if we consider the migration of subjects to be employed in the mines, the loss of lives, and the expences of digging, refining, and importation to *Europe*."—And thus the "charges, which stood before, as one to sixty-four, became as two to sixty-four, as the specie grew doubled in quantity, and diminished one half in value.

"If we proceed doubling and doubling, we shall find, in this progression, the cause of the impotency of the wealth of *Spain*.

"It is about two hundred years since the *Spaniards* began working their *Indian* mines. I suppose, the quantity of specie, at present, in the trading world, is, to *that* before the discovery of the *Indies*, as *thirty-two* is to *one*; that is, it has been doubled *five* times; in two hundred years more, the same quantity will be, to *that* before the discovery, as *sixty-four* is to *one*; that is, it will be doubled once more.—In this progressive state, the same mines, in that tract of time, will hardly defray the expences of working them. And, if mines should be discovered so fruitful as to give a much greater profit, the more fruitful they may prove, the sooner the profit will cease.

"I have frequently heard people deplore the blindness of the court of *France*, which repulsed *Columbus*, when he made the proposal of discovering the *Indies*. This, though perhaps without design, proved, in the end, an act of the highest wisdom,

Spain

Spain has behaved like the fooliſh king, [c] who deſired, that every thing he touched might be converted into gold: And who was obliged to beg of the gods to put an end to his miſery.

"The companies and banks, eſtabliſhed in many nations, have given a finiſhing ſtroke to the lowering of gold and ſilver, as a ſign or repreſentation of riches: For, by *new fictions*, they have multiplied, in ſuch a manner, the *ſigns* of wealth, that gold and ſilver, having this office only in part, are become leſs precious." [d]

Nevertheleſs, theſe reaſonings hold not in force againſt all mines, for ſuch as are found in the *mother-country*, like manufactures which are wrought upon materials of our own production, are known to be of great uſe and advantage to the community.

Of ſuch nature in *England* are the lead-mines and tin mines of *Derbyſhire* and *Cornwall*; the gold and ſilver mines of *Germany* and *Hungary*; the iron-mines of *Stiria*, and thoſe of quick-ſilver in *Idria*: For though, in truth, they hardly produce more than one half of what defrays the expence of working them; yet, at the ſame time, they are the means of employing a great number of labouring people, whom they render bold, robuſt, and hardy. Theſe people, alſo, conſume a large quantity of ſuperfluous commodities. But ſtill one proviſo muſt be always borne in mind: Which is, that ſuch labours ought never to draw men off from the culture of the field; for a nation cannot be truly rich that neglects the ſurface, and ſeeks for wealth in the bowels of the earth.——"The culture of the ſoil," ſays *Monteſquieu*, "is the greateſt of all manufactures, and the trueſt ſource of riches."

This

[c] *Midas.*

[d] *Eſprit des Loix*, tom. II. l. xxi. c. 18,

This train of thinking brings to mind the imperfect remembrance of a short story or fable in an old *Spanish* novel-writer; which may serve to explain my meaning in a more instructive, and, at the same time, a more agreeable manner, than I could pretend to give it, without calling in the assistance of another hand.

When or where I met with this fable I cannot say; but flatter myself, that the design and manner of the author are represented in the following narration with tolerable exactness, at a distance of thirty years from the time of reading it:

In the age of the American *adventures*, *about the year* 1550, *when all* Europe *proposed to grow rich in a moment*, *a* Spanish *gentleman*, *one Don* Gregorio de Brice, *being acquainted with some of* Orellana's *companions*, *lately returned from the* River of the Amazons, *procured intelligence of a small island*, *called by the natives* Rhadamilla. *This little spot of land was represented to be the true* Hesperides *of the antients*; *for it abounded with woods*, *rivulets*, *pasturage*, *and gold-mines. Nay*, *the very stones were reported to have a mixture of gold in them.*

Animated with this relation, *Don* Gregorio *turned his whole estate into money*, *and fitted out a ship*, *persuading his younger brother*, *Don* Estevan, *to join with him in the adventure. The latter was a man of a cool head*, *and totally devoid of ambition and avarice*, *but complied from mere affection to his brother*, *whom he loved passionately*, *having no other relation.*

In the voyage Don Gregorio *touched upon the coast of* Barbary, *and purchased slaves to work in his mines:* Estevan *bought only a couple of score of sheep and a dozen of goats*, *with two males of each kind. Being asked the reason*, *his answer was*, *You*, *my brother*, *are a second* Cain, *a man of a bold enterprizing genius: I will imitate the humble* Abel, *and turn pastor*; *for*

meat

meat and cloathing must be thought of, as well as the acquisition of precious metal. It shall be my business to act the part of proveditor general for you and your labourers, who may possibly find gold to be neither eatable nor drinkable. I will therefore supply the company with food, and you shall pay me for it out of your vast treasures.

Upon this Don Gregorio *laughed; but a slight air of contempt was intermixed with his laughter. Ah, brother, said he, you have no spirit, no elevation of sentiment; that mind of yours runs too much upon vulgar matters. The man that has a mine of gold commands every thing that this sublunary world can afford. —No, no—replied an old mariner from the bay of* Biscay, *shaking his head; there is a dash of good sense in Don* Estevan's *proposal.—It is sometimes necessary to eat, as well as grow rich.*

At length the ship reached the desired island. A gold mine was found according to expectation, and the produce thereof made it worthy to be called a Potosi *in miniature. Meanwhile Don* Gregorio *gave himself little concern about bodily sustenance, living in a great measure by imagination, and feeding upon the hopes of future abundance: But his associates had not sublimity of fancy enough to relish such fictitious aliment; for, after having worked all day, they were just able to support life with a few small fishes hard to be taken, and some ordinary fruits and vegetables, such as could be found in the neighbouring woods and vallies. During this interim, the shrewd sensible* Biscayner, *already mentioned, missed little of occasioning a mutiny without intending it: For, having found no supper in the fields, not even a salad of trefoil-leaves and thistle-roots, he set his foot on a lump of gold which lay in the hut, and broke out into the following exclamation: Fatal deceiver of mankind! said he, what art thou in thyself?—Gladly would I exchange twenty such lumps of metal for as many pounds of the worst mutton fed upon* Estremadura *turnips!*

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The rest of the crew conceived the same indignation that the Biscayner *did; but Don* Estevan *composed the disorder by assuring them, that to morrow he intended to kill a lamb and a kid three parts grown, in order to give a bountiful repast to the whole society.*

This he continued thrice a week; and from that time matters went on very comfortably: For Don Estevan *fed the men well, and cloathed them with the wool of his sheep and skins of his goats. His brother gave an equivalent in gold for all that was purchased; and that with a certain justice and nobleness of soul, quite peculiar to an old* Castilian.

After three years thus spent, the men petitioned to return to old Spain, *alledging, amongst other things, that their ship (though a new one, when they set out) would never be able to sail home, in case they stayed another winter. Their wealth, though of great value, was easily stowed, and a prosperous navigation soon carried them to the* Canaries. *As the weather still continued fine, Don* Estevan *proposed to his brother to settle their accounts; but, when the whole debt due to the former was fully perused, Don* Gregorio *changed colour, and, letting the papers fall, O* Estevan, *cried he,* I am a bankrupt—I am undone!—*But my brother has gotten what I have lost, and that is sufficient!*

You are only mistaken, *my dear brother, said* Estevan *coolly, but not* undone. *You wanted to acquire* that *wealth instantaneously, which Providence decrees to man under the condition of earning it by little and little, with long perseverance and moderate desires!—— To gain riches in a moment is not industry, but gaming.—You acknowledge the error, and it is my business to repair your loss. One third therefore of our acquisitions is for ever yours; a second part shall be reserved for myself; and the residue distributed to the ship's company. It is likewise but a proper acknowledgment to the bounty of Providence, that the slaves should have their liberty, and end their days in quiet with you*

you and me, as they were always our fellow-creatures, and at preſent our fellow-chriſtians.

The moral of this novel, or fable, ſpeaks itſelf.

Yet, in all theſe remarks, we would by no means intend to be underſtood, that the bringing great ſums of money into any kingdom is the infallible means of augmenting the prices of common proviſions, or an irreſiſtible temptation that neceſſarily produces luxury, idleneſs, wants real or imaginary, provided, at the ſame time, the nation thus deſcribed be truly induſtrious, and perſeveres in its induſtry, after ſuch wealth is imported.—Nevertheleſs, the conſequences above-mentioned (at leaſt as things uſually happen) are highly probable, and much to be guarded againſt by ſalutary regulations of the legiſlature, and prudent precautions in individuals. All we inſiſt on is, That *ſuch ill conſequences* are in no ſenſe *neceſſary and unavoidable ill conſequences*, it being an allowed maxim in the ſchools, That the uſe of any thing (provided a regulation may be introduced) ought not to be ſuperſeded on account of the abuſe of it.

In proof of this let it be remarked (but ſtill under condition a nation preſerves its diligence in huſbandry, trade, mechanic arts, *&c.*) that proviſions were reaſonably cheap at *Athens*, even when agriculture, painting, and ſculpture were in high vogue, when works of elegance bore an extraordinary price, and artiſts had attained ſurprizing perfection. There was a magnificence alſo on ſome public occaſions in the expences of the ſtate. Yet the ſame ſtate (nor is it ever ſpoken of by the antients as an act of parſimony) allowed a couple of *Ariſtides*'s relations, that were reduced to great poverty, one drachma [d] each per diem, by way of maintainance: Which ſhews, that, in the midſt of ſo much public wealth and ſplendor, the proviſi-

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[d] Seven-pence three-farthings.

ons neceſſary for well-ſupporting life were purchaſable on eaſy terms. The *Prytaneum* gave his two daughters a portion of 3000 drachmas [g] each, which was their whole fortune, for their father left them nothing. They allowed the ſon 100 *minæ* of ſilver, [h] as many acres of cultivated land, and half a crown and one penny a day, by way of penſion.

At the ſame time *Gelon*, who poſſeſſed only a part of *Sicily*, offered the *Greeks*, in the *Perſian* war, a ſupply of 200 gallies (of that ſort called *triremes*) and a land army of 28,000 ſoldiers, cavalry and infantry, under engagement to maintain them with corn gratis, provided he had the power granted him of commanding this body of auxiliaries.. Which ſhews, that there was great opulence and populouſneſs in his territories, and abundance of corn at a moderate price.

Thus the kings of *Agrigentum* and *Syracuſe* had great riches, together with powerful fleets and armies, and yet ſupplied the *Romans* with bread at an eaſy purchaſe.

Pomponius Atticus, a perſon of known rank and faſhion, received the beſt people of *Rome* at his table, where the entertainment may be ſuppoſed to have been genteel, but not luxurious, when, at the ſame time, as appeared by his diary of expences, he ſpent no more in houſe-keeping, than about 24 *l.* a month. [i]

About the time of the battle of *Marathron*, proviſions bore near the ſame moderate price in *Italy*, as in *Greece*. An ox was valued at 10 *s.* 6 *d.* and a ſheep at 13 *d.* or thereabout.

The elder *Cato*, who was cotemporary with *Scipio Africanus*, never expended more than 100 *drachmas* or 3 *l.* 4 *s.* 7 *d.*) on a ſuit of cloaths, even when he was con-

[g] About £. 96 2 6.
[h] £. 322 18 4.
[i] C. Nepos in Vita Pompon. c. 13.

conſul or general: And the proviſions for his ordinary table, at dinner, uſually coſt 2 *s.* Yet *Greece* and *Italy* were then very rich, and individuals gave incredible ſums for matters of ornament and rarities.

It may now be proper to exemplify theſe truths by modern inſtances. Much money is poſſeſſed by the *Chineſe*, yet agriculture is maintained in full vigour, and more reſpected by the government, than any other employment. Hence it happens, that proviſions are cheap among them, and field-labourers are no where hired at more moderate wages. To which may be added a ſecond policy of ſtate, which is, that much money enters the kingdom, and very little finds its way abroad; nor does the nation vend any commodities, but thoſe of its own growth or production; which ſecret in directing the manufactures and artizans of any country is ineſtimable.

It is probable, that the price of proviſions, in *England*, is not ſo much enhanced by the quantity of wealth abounding in it, as from other aſſignable reaſons which I ſhall forbear to mention. Corn is much cheaper than it was in half the laſt century, or during the whole of the preceding one: And great plenty of corn helps to leſſen the price of butchers meat. Rye and barley bread, at preſent, are looked upon with a ſort of horror, even by poor cottagers, and with ſome excuſe; for wheat now is as cheap as rye and barley were in former times; and therefore the yeomanry of this kingdom, about one hundred and thirty years ago, mixed both theſe vegetables with wheat to make bread: But the very name of this mixture is now forgotten: [d] Whilſt the pure flour of wheat, made into bread, was hardly taſted but at court, and in the houſes of the nobility

[d] It was called *maſlin*-bread, quaſi *miſcellane*.

bility and prime gentry, where it bore the name of *cheat*.

True it is, that moſt articles of ſubſiſtence are dear in *Holland*, where money is plentiful: And the wonder is they are not dearer; *Holland* is a body kept alive by the medicines of ſtate policy; it conſiſts of a ſmall ſpot of ground, and that ground is of an intractable nature, averſe from agriculture.

On the other hand, money is ſcarce in *Italy* and *Germany*, but common uſeful proviſions are dearer there than with us; nay, if we take quantity and quality both, few travellers will find a country where bread and butchers meat, upon the whole, are cheaper and better than in *England*. Of courſe, from all that has been ſaid, wealth, in prudent governments, bleſſed with induſtrious ſubjects, needs, not neceſſarily entail ſcarcity and dearneſs on the common uſeful food, fit and convenient for ſupporting life.

If it be aſked, why corn is cheaper and more abundant in *England* now, than it was fourſcore or one hundred years ago, the anſwer is plain, becauſe the legiſlature has wiſely, in that reſpect, granted the liberty of exportation, which gives new life to the cultivator.

All theſe remarks lead me back to obſerve, that *Spain* was not merely ruined by the acquiſition and importing of *American* gold, *but by neglecting agriculture and the other arts of gaining ſubſiſtence at home*. Hence aroſe the true ruin of *Spain*; money will not promote propagation; men can feed on bread, but they cannot feed on gold; nor were the *Spaniards* catholics enough, in this ſenſe, to eat the deity they adored. But infatuation dazzled that nation, and ſo it may many others: Aiming at too extenſive a power, "*Elle trocqua ſes hommes* (ſays a ſpirited author) *contre des lingots, et aima mieux moiſſoner des metaux, que des graines. Enyvrée de ſes richeſſes, les*

arts utiles furent mépriſes: La peſanteur des impots les ecraſa; & ſon peuple découragé ſe livra à la vaine gloire & à l'indolence." [k]—To which may be added a combination of other cauſes ariſing from miſjudgment and ill management; as perſecutions and expulſions on the one hand, and permitted migrations on the other; the celibacy of the religious orders; the exemption of the nobility and gentry from taxes, and transferring the intolerable weight upon the poor and laborious. All which, combined together, made a writer of their own country obſerve (for no perſons are clearer-ſighted than the ſenſible part of the *Spaniſh* nation) "that the people who ſailed to *America*, in order to return laden with wealth, would have done their country much better ſervice to have ſtayed at home, and guided the plough: For more perſons were employed in opening mines and bringing home money, than the money, in effect, proved worth." [l]

Colbert rather depreſſed than promoted the intereſts of *France*, when he conceived a project of enriching it by eſtabliſhing a vaſt number of manufactures, [m] flattering himſelf at the ſame time, that, by making the productions of his manufactures ſubſervient to luxury and falſely-refined elegance, he ſhould multiply the wealth of his own nation by ſupplying and feeding the extravagance and vanity of other nations; *but ſome part of the folly happened to ſtick where it took its riſe, and became infectious at home*; which ſhews, that luxury is an unfortunate faſhion in any country, though, at the ſame time, it-preſcribes the mode to foreigners, and induces them to purchaſe ſuch merely ornamental elegancies as are the workmanſhip of our own artiſts. Under the idea of

[k] *Police des Graines*, p. 227.

[l] *Albyterio*.

[m] *Memoire du Marquis de* MIREBEAU, *pour concourir du Prix*, &c. 1761.

of hoarding up great ſtore of proviſions for the ſupport of his work-folks (and that principally by obſtructing the free vent and exportation of corn) this miniſter had the applauſe of the poor, who naturally favour any ſcheme, real or imaginary, that promiſes to lower the price of bread; for their underſtandings can rarely ſee deeply into the truth of things, any more than the advantage of a nation in general, or of themſelves upon the whole. In like manner the hiſtorians and poets loaded the prime miniſter with panegyrics, as the true father of the people, and made no ceremony to depretiate the wiſer conduct of *Sully*. But alas! it never truly appeared, that trade and commerce, even in their moſt flouriſhing ſtate, inriched a kingdom like the ſolid revenues that proceed from a right and effectual cultivation of the earth. Thus, though the *French* nation was intoxicated with the hopes of immenſe riches, and though they ſupplied all *Europe* with ſilks, embroideries, and expenſive trifles, yet the fund of real wealth was deficient at bottom. Famine made its appearance frequently, and almoſt periodically. The proprietors of landed eſtates (for they, with others at firſt, ran into the univerſal notion of admiring the project) thought themſelves very happy, after a conſiderable tract of time, to advance their rents a *ſixth* part, though money bore *one third* a greater value than before. Impoſts and taxes were increaſed immoderately: And a conſiderable part of the lands (not being found, or, at leaſt, not believed to anſwer the expences of cultivation) was overlooked and neglected by little and little, and, at length, degenerated into waſte and deſolated tracts of country. All which may ſuffice to ſhew, that the cultivation of the earth ought not to be ſuperſeded by a paſſion for commerce. The ſecret is to encourage both, and that equally, without partiality.

One might expatiate more upon this ſubject, but the preſent age is not diſpoſed to reliſh a diſcourſe upon ſuch a topic. Agriculture is held in ſmall eſteem; [n] the proſperity of a country is looked upon as independent of *its* aſſiſtances. Depopulation is not dreaded: The increaſe of the poor (a natural conſequence in manufacturing countries) is not regarded. Men would be rich too compendiouſly; the returns of the earth are ſlow, laborious, and overſcanty; whilſt great fortunes, acquired too ſuddenly, deſtroy equality, the foundation of liberty.—Nay, the helps of agriculture muſt always be called in to ſupport manufactures, either at a flouriſhing, or languiſhing period;—ſince, in the latter caſe, at leaſt, not the ravage of war will be found to produce more poverty than may be ſeen in a manufacturing town, when any unforeſeen unfortunate accident ſtops the vent of the manufacture. But I ſhall leave a full examination of theſe points to writers of greater ſpirit and underſtanding. The Marquis *de Mirebeau* (in a land not very famous for freedom) ſpeaks thus on the occaſion: "*Les maux politiques*" (dit-il) *ſont tous contagieux: Peutêtre que l' epidemie eſt dans notre voiſinage. A tout haſard je parls à l' univers. Que ceux qui ont ſuſcité ma voix, me pardonnent l' extenſion de mes organes!* [o]

But theſe topics are far beyond my ſtrength to undertake. I tremble to touch them, as *Dares* did, when *Entellus* threw down upon the ground, before the combatants, the gauntlets of *Eryx*. It may become

[n] "Certainly we are all afraid" (ſays *Blythe*) "leſt our plenty ſhould be our ruin, or elſe men that ſtudy ſo much to get eſtates at ſecond-hand one from another, would rather ſtrive to gain them at firſt-hand out of the earth."

Improver improved, 4°. 1653, p. 127.

This remark ſeems to be copied from *Columella*:

Supereſt unum genus liberale & ingenuum rei familiaris augendæ quod ex agricolatione contingit. L. i. *in Procem.*

[o] *Memoire pour concourir au Prix*, &c. 1761, p. 264.

come me rather to ſay, with one of the moſt uſeful and ſenſible writers among the antients,

Sed quid ego infræno volitare per æthera curſu
Paſſus equos audax, ſublimi tramite raptos?
* * * * * * * * * *
Me mea Calliope cura leviore vagantem
Jam revocat, parvoque jubet decurrere gyro,
Et ſecum gracili connectere carmina filo,
Quæ canat inter opus muſa modulante putator,
Pendulus arbuſtis, olitor viridantibus hortis.
COLUMELL. *de Hortis*, v. 216, *&c.*

How durſt I raſhly urge my ſteeds to riſe,
And whirl th' advent'rous chariot thro' the ſkies?—
Me my *Calliope*, with tender care,
Recalls, to trifle in a ſafer ſphere:
Me ſhort excurſions ſuit, fore-warn'd to tread
A modeſt path, by tim'rous fancy led,
And ſpin plain georgics of an humbler thread:
Nature's effuſions! uninform'd by art,
Untaught by books, and recent from the heart.
The pruner's ditty; which he chaunts with glee,
Imboſom'd in the foliage of a tree! [c]

Here, therefore, I ſhall ſtop my courſe, having imbarqued on a gentle ſtream, but finding myſelf approaching, by degrees, to the main ocean. Beſides, without entering deeply into theſe great national difficulties, my meaning is partly different

 from

[c] As *Columella* lived not a great many years after *Virgil*'s time, it is very extraordinary that this beautiful poem, on the *culture of gardens*, which ſeems to be a continuation of *Virgil's Georgics*, according to *Virgil*'s own plan (as may be ſeen in a note to page 92) has never yet been tranſlated by any of our celebrated *Engliſh* poets. I ſuppoſe, what deterred them was the not being experienced in matters of culture, and the difficulty of aſſigning the true names of the plants which our author treats of.

from that of the *French* writer above cited ; conſequently I ſhall repeat what has been before mentioned by me, and continue to remark, that agriculture, trade, and commerce, muſt be all cheriſhed, counter-balanced, and harmonized in every well-governed and flouriſhing ſtate ; and, when ſuch is the caſe, any induſtrious and virtuous nation may diſpenſe with the abſence of *Potoſi*, and all its mines. " For thoſe riches," ſays *Monteſquieu*, are of a bad kind, " that depend upon accidental circumſtances, and not upon the induſtry of a people, and the cultivation of their lands."

When the wealth of the kingdom of *Bambouch*, in *Africa*, was diſcovered, about the year 1716, the land gave earneſt of abounding as much in gold as *Peru*, *Mexico*, and *Braſil* : For gold, according to the relations of the firſt adventurers, might be collected and gathered up without digging ; and, as *Ovid* ſaid of the earth, when touched by *Midas*,

———*Saxum quoque palluit auro :*

But the ſoil was harſh, ſcurfy, and unprolific, hardly affording the common neceſſaries of life ; ſo that the inhabitants were half ſtarved, and extremely miſerable.

Nay, what is ſtill more remarkable (as will appear upon peruſing the author laſt cited) " no laſting, ſolid, and uſeful wealth can be expected, even from the fine arts themſelves, [c] if they ſupply, in general, the ornaments of luxury ; and more eſpecially, if we live in an age, like the preſent one, made up of calculations, tarifs, intereſt, ſtocks, and agios. [d] All ſuch political heat is of an hectical nature,

[c] See the ſame propoſition confirmed in the *Numbers of Mankind*.

[d] Laxitas mundi, & rerum amplitudo damno fuit.——Poſtquam nil magis ornabat quam cenſus, & captatio in quæſtu fertiliſſimo,

ture, and, at length, circulates tainted juices thro' the blood."

"In the midst of the darkness," continues he, "of this universal *idolatry*, agriculture might have been extinguished, if its nature had been capable of such extinction: But, as the art we are here speaking of submitted with resignation to her boisterous invaders, so humility and modesty concealed her in part from the disdainful eyes of her conquerors. And, indeed, what better terms could *she* expect, being of a mild, benevolent, communicative disposition, desiring nothing but what she had dearly earned by her labours, subsisting solely on the gifts of the heaven and the earth, and naturally endued with so much diffidence, as never to presume to reason, except from experience and matters of fact?—— Nevertheless, as reproduction, according to the uniform revolution of nature's laws, is the child of putrefaction, agriculture, the common and necessary mother of all, will again assume a second life, and shake off the yoke of servitude. Thus she revived, in the last century, amongst the

—— "*Penitus toto divisos orbe Britannos.*" [b]

From this passage of *Virgil*, it seems natural to observe, that our nation appeared, in the poet's eyes, to be as far removed from the true knowledge of agriculture, as from the *then* civilized and cultivated parts of *Europe*. Nor does it appear, that he had any notion of our kindly temperament of air, or of the strength and richness of our soil.

But our countryman, *Cowley*, *Virgil*'s lawful successor in georgical writings, has supplied what the

 great

tilissimo, pessum iêre vitæ pretia.—Cum voluptas cœperit vivere, vita ipsa desiit. Plin. *Hist. Nat.*

[b] *Memoire du Marquis de* Mirebeau, adressé à la Societé de Berne, 1760, p. 230—235.

great master was not enabled to mention, and given us no unpleasing picture of the natural good qualities of our happy island, with respect to husbandry; so that, if I here make a slight digression, it will probably be pardoned me upon easy terms, being a sort of tribute justly due to one's native country.

Cowley's description is as follows; and I, the rather, cite the passage at length, as the poem is scarce, and printed separately from our author's works:

Herculeas metas inter magnique Columbi
Fulvum orbem, medio longè jacet INSULA *ponto,*
FORTUNATARUM *pulcherrima; quam beat ingens*
Naturæ favor, & mira indulgentia cœli.
Non illic placidum, constans, solidumque serenum
Importuna cohors, venti pluviæque lacessunt.
Solus odoratis alarum molliter auris
Plaudit humum Zephyrus, fœcundoque incubat anno.
Non ILLAM *tristi nubes lachrymosa macrâque*
Pascit aquâ, tacito saturat sed rore benignus
Æther, & succis vitalibus astra saginant. [f] —
Perpetuum & nullo violabile frigore regnum
Occupat hic modicis defensa caloribus æstas, [g]
Ditior autumno, vere & formosior ipso; —
Hic locuples nullis conturbat mensibus arbor,
Sed frondes simul & flores fructusque ferentem
Omnis læta videt, videt omni Cynthia vultu;
Plurima nec tribuens, quædam negat invida, more
Nostrati; hic eadem semper fert omnia tellus. [h]

Of

[f] In the age our author writ, all plants were supposed to be under planetary influences. As opinions are changed, we have varied the idea in our translation.

[g] Αλλ' αἰεὶ ζεφύρειο λιγυπνείοιο πνοιὰς
Ωκεανὸς ἀνίησιν ἀναψύχειν ἀνθρώπους.
Homer.

But from the breezy deep the bless'd inhale
The fragrant murmurs of the western gale.
Pope.

[h] COULEIUS *de Plantis*, l. v. v. 50.

Of which the reader may be pleased to accept this imperfect translation:

Between th' *Herculian Streights* renown'd of *old*,
And a *new* world, whose earth is ting'd with gold,
A beauteous ISLE emerges in the west,
Happiest of ev'ry island, styl'd the *blest!*
Heav'n gave it softer skies and *milder* air,
And nature nurs'd it with a mother's care:
Nor storms nor tempests, break its calm repose;
But the whole year in equal tenour flows:
While *Zephyr* gently spreads his roseate wings,
Or broods prolific o'er congenial springs.
No acrid moisture, no malignant rain,
Falls from the flatt'ring skies, and falls in vain;
But soft'ring show'rs refresh the peasant's toil,
And air's soft influence vivifies the soil.
Here sullen winter abdicates the throne,
And seeks *Cimmerian* realms, by birth his own;
Perpetual summer reigns perpetual king,
Richer than autumn, lovelier than the spring.
The trees are cloath'd with verdure all the year:
At once they bud, they blossom, and they bear.
Nature surveys with joy the prosp'rous plains;
She gives not *much* like *man*, and *part* detains;
The care of nature is unvarying care,
And the same earth bears all things ev'ry year.

Our author afterwards observes (as a mark of divine favour on the one hand, and an incitement to human industry on the other) that most foreign vegetables may be naturalized in our happy island:

Plantæ alibi lectæ ——
——— *Hic nullo tempore cessant.*

I have already made some apology for my seeming partiality towards this author, whenever he treats

treats upon georgical ſubjects; which he underſtood in a more elegant, as well as more ſcientifical manner, that any man ſince the days of *Virgil*; and, by all accounts it has been in my power to collect concerning him, I may ſafely venture to inſcribe to his memory the beautiful verſes which *Statius* addreſſed to his friend *Atedius*; (which can hardly be exceeded, except by *Cowley*'s own verſes conſecrated to the memory of Mr. *William Harvey*:)

Tu cujus placido poſuêre in pectore ſedem
Blandus honos: hilariſque (tamen cum pondere) virtus;
Cui nec pigra quies, nec iniqua potentia, nec ſpes
Improba, ſed medius per honeſta & dulcia limes.
Incorrupte fidem! nullos experte tumultus;
Et ſecrete palam qui digeris ordine vitam!
Idem auri facilis contemptor, & optimus idem
Condere divitias, opibuſque immittere lucem!—

But here a premature death cuts off a part, which one would wiſh that Providence had made his portion!

Hic longûm florens animi morumque juventâ,
Iliacos æquare ſenes, & vincere perſta.
Sylv. L. ii.

It is hard to ſay, whether *Cowley*, when he drew his picture of *England*, had *Homer*'s deſcription of the iſland of *Ithaca* in his eye or not: For he ſeems partly to have copied the account of the gardens of *Alcinous* in the ſeventh *Odyſſey*; but certain it is, that our country-man's verſes will ſuffer no diſgrace, tho' they are placed in the ſame or next page with thoſe of the *Grecian* poet. The paſſage relating to *Ithaca* will be found in the thirteenth Book of the *Odyſſey*,

Odyssey, when *Minerva*, having cast a mist over *Ulysses*'s eyes, describes to him his native country:

Thou seest an island, not to those unknown
Whose hills are brighten'd by the rising sun,
Nor those who, plac'd beneath his utmost reign,
Behold him sinking in the western main.——
Earth, not ungrateful to the peasant's pain,
Suffices fulness to the swelling grain:
The loaded trees their various fruits produce,
And clust'ring grapes afford the gen'rous juice;
Woods crown our mountains, and in ev'ry grove
The bounding goats and frisking heifers rove;
Soft rains and kindly dews refresh the field,
And rising springs eternal verdure yield °.

Pope.

I could

° ——————Ισασι δέ μιν μάλα πολλοὶ
Ημὲν ὅσοι ναίουσι πρὸς ἠῶ, τ' ἠελιόν τε,
Ηδ' ὁσσοί μετόπισθε πολὶ ζόφον ἠερόεντα——————
Εν μὲν ἀρ' οἱ σῖτος ἀδέσφαλος, ἐν δέ τε οἶνος
Γίγνεται· αἰεὶ δ' ὄμβρος ἔχει, τεθαλειά τε ἕρση·
Αιγίβολοι δ' ἀγαθὴ κὴ βέβολος· ἔξι μὲν ὕλη
Παντοίη, εὖ δ' ἀρδμοὶ ἐπητανοὶ παρέασιν.

Odyss. N.

What *Pliny* said of *Italy* may be applied with equal propriety to *England*; "Ergo in toto orbe, & quacunque cœli convexitas vergit, pulcherrima est omnium regio, rebusque merito principatum obtinens, rectrix parensque mundi altera; viris, fœminis, ducibus, militibus, servitiis, artium præstantia, ingeniorum claritatibus, jam situ ac salubritate cœli atque temperie, accessu cunctarum gentium facili, litoribus portuosis, benigno ventorum afflatu.——aquarum copia, nemorum salubritate, montium articulis, animalium innocentia, soli fertilitate, pabuli fertilitate. Quicquid est quo carere vita non debeat, nusquam est præstantius."

"Salve, magna parens frugum, Saturnia tellus,
Magna virûm! Tibi res antiquæ laudis & artis
Ingredior, sanctos ausus recludere fontes."

Virg. Georg. II. 173.

Nor

I could no-ways deny myſelf the pleaſure of giving *Cowley*'s deſcription of our beloved native country ; but, as ſome abatements ought to be made for the brilliant ſallies of a poetical imagination, it may be worth while to remark in plain proſe, That our country, in one particular reſpect amongſt others, is as happily circumſtanced as any tract of land upon the face of the earth : For it is not fertile enough to make men indolent, nor barren to ſuch a degree, as even to deny grateful, if not ample, returns to the induſtrious cultivator. In a word, it enjoys the fortunate medium between fertility and barrenneſs, or (to ſpeak more properly) between eaſy and difficult culture : Inclining rather *to the ſide of difficulty*, and affording opportunity ſufficient for induſtry and improvements : Which is juſt the circumſtance a perſon would wiſh for, who truly underſtands the good of his country.— Rich ſoils infuſe eaſe and indolence into the inhabitants, and ſometimes (in caſes of war and danger) an undue fondneſs for the preſervation of life ; whereas a country, ſomewhat difficult to be cultivated (and where men are obliged to procure with labour what the earth refuſes them either by ſpontaneous or even an eaſy growth) ſuch a country, I ſay, contributes, by way of compenſation, to render its occupiers induſtrious, ſober, inured to hardſhips, courageous, and fit for military ſervice. And hence it has been remarked in the *German* armies, that the *Saxons* (if you except ſuch as live in the mine-diſtricts of *Saxony)* the inhabitants of the duchy of *Magdeburg*, and the *Lower Palatinate*, make

Nor ought we to forget here a ſimilar paſſage in *Euripides*.

Ουρανὸν ὑπὲρ γῆς ἔχομεν εὖ κεκραμένον,
Ἰν' ὀῦ ἄγαν πῦρ, ὄυτε χεῖμα συμπιτυεῖ·
Η δ' Ελλὰς, Ασία τε καλλιςα τρέφει
Τῆς γε δέλεαρ ἐνταῦθα συνθηρεύομεν.

make not so good soldiers as those who are taken from parts of the empire, where the culture of the earth is more difficult.—Of this we have a plain proof in the last century. When the prince of *Phaltzburg* marched eighteen thousand *Lorrainers* into *Germany*, for the assistance of *Ferdinand* II, these elegant troops, during their half-year's campaign, performed nothing, but, having lost two thirds of their numbers, without exchanging a blow, returned ingloriously to their wonted indolence, ease, and plenty, in the rich plains and vallies of *Luneville* and *Nanci*.

Indolence, without plenty, has been known to produce such effects as those last described. Thus the *Spanish* land-forces are pusillanimous, improvident, and inactive, having never been much accustomed, either to domestic or husbandry labour, whilst the natives of the self-same country, inured to the fatigues and dangers of a naval life, ascend, by degrees, to the true antient *Castilian* spirit of generous thinking and heroism.——

Having thus finished the greater part of my observations, with regard to the subject of my first Essay, I shall only take notice, that my second Essay (and whatever else I may happen to write, with regard to husbandry) is intended to be merely of a practical nature, or deduced from matters of experience in myself or others, care having been taken to admit no hypothesis, or even conjecture, without being specified as *such:* No chymical observations, or mathematical reasonings; and that from a persuasion, that husbandry receives few assistances, except from natural sagacity and matters of fact. Speculations and seeming conclusions, not founded on experience and practice, may be compared to a prism, which varies objects and colours, according to the guidance of the hand that holds it. —— For these reasons, I have made husbandmen

(that

(that is to say, *such* of them as I have known to be men of experience, good observation, strong parts, and weaned from prejudice) my first and almost only critics through the course of this work: And have listened to their remarks, not only with attention, but docility; being sensible that many a great genius, of this sort, lives concealed in a thatched dwelling: And, therefore, we may compare such husbandmen to some of the oaks which grow on their farms; the bark is rough, thick, and knotty, but excellent sound timber lies concealed beneath it.

I only wish that I could have received written assistances from them; for there is more plain, strong, unadorned sense, more native truth, genuine beauty, and solid matter of fact, in the writings of *Gabriel Plattes*, *de Palissy*, *le sieur Giauque*, and *Peter Somer*, [h] than in the well-turned periods of a *French* academician.

I shall next observe, by way of caution to the reader, that we are too apt to give the name of modern improvements to antient practices of husbandry, upon their being *revived* amongst us; for many useful inventions have been (in great part, at least) lost, or forgotten unaccountably, *desidia rerum, internecione memoriæ inducta*; and hence it will appear, to all persons conversant in books of agriculture, that neither we, nor our neighbours in foreign countries, have made so many discoveries and improvements, for a century past, as one is apt to imagine at first sight. It is therefore the business of a candid writer to be *just* to the present age, and not *unjust* to preceding ages.—*Tull* has no right, or even pretension, of laying claim to

[h] The first of these had been a *shop-keeper*, the second was a *potter*, the third is a *little farmer*, and the fourth a *day-labourer*.

to the *drill-plough*, [b] which had been used in several *European* countries, almost half a century before he set pen to paper.——Nay, our ingenious countryman, *Gabriel Plattes*, seems to have had some idea of an instrument almost of a similar nature, during the reigns of *James*, or *Charles* I, tho' his book was not published till the times of the common-wealth. And, indeed, I believe all good husbandmen, in all ages, had a notion that wheat should be sown or set at distances, and those considerable ones. *The main perfection of sowing*, says *Pliny*, *is to disperse the seeds equally*. [c] This notion he received from *Xenophon*. [d] —Nor owe we the *field-turnips* to *Tull*, but the *Flemings*: And that as long ago as in the middle of the last century.—The nature of all sorts of manures, was, at that time, perfectly well understood.——Fold-

[b] An account of the *Spanish* sembrador was published by the Earl of *Sandwich*, soon after the restoration. See *Philosoph. Transact.* N°. 62.

After all possible researches, I find it difficult to determine what nation claims the credit of inventing the *drill-plough*. It is certain, that Lord *Sandwich* is mistaken, in saying that *Lucatello* invented it; he only was the first *Spaniard* that learned to manage it from an *Austrian* engineer, about the year 1660. *See Essay* II. Sect. 30. How long, therefore, the *Austrians* were in possession of this secret, before they imparted it to the *Spaniards*, is a circumstance not easy to be ascertained. Thus much may be depended upon, that *Hartlib* mentions a drill-plough, by name, nine years before the *Spaniards* boasted of their sembrador: *See Legacy*, p. 10, 1651; *Blythe* also knew it, and says expressly, that it ploughed, sowed, and harrowed, at one and the same time. *Improver improved*, 1653.

It is equally hard to ascertain, how long the *Chinese* have been in possession of a drill-plough, but, in all probability, for many ages. An exact model of one (where the contrivance is noways contemptible) was sent to the keeper of the seals in *France* by father *d'Incarnville*, and a print of it may be seen in the *Culture des Terres*, tom. II. p. 190.

[c] Artis est equaliter spargere, l. xviii. c. 24.

[d] *In Oeconom.*

Folding ſheep, and wheel-ploughs, were thoroughly known in *England*, during the reign of *Henry* VIII. *Columella*, and the *Greek* geoponic writers, ſaw the advantage of a *compoſt-dunghil*, and that, in all probability, better than we do.

Nay, in here and there an inſtance, our induſtry has been inferior to that of our predeceſſors: Or, at leaſt, it may be obſerved, *Priſcorum aut cura fertilior aut induſtria felicior fuit.* We plough leſs, and ſow later than they did. [b] Marle (the moſt laſting and cheap of all manures, which may be found in numberleſs pariſhes throughout this kingdom) is known, and uſed much leſs, at preſent, than in the two preceding centuries. In a word, few manures of much conſequence have been lately diſcovered, except peat-aſhes; the ſowing of which is confined within a circle of 20 miles diameter, though peat (of more or leſs valuable kinds) is to be found in moſt counties of our three kingdoms.

I ſhall finiſh my remarks under this article with one collateral inſtance, which is, that not only the idea, but actual introduction of *pariſh work-houſes*, ("for the more profitable employment of the half diſabled poor, or ſuch as are too young or old for works of agriculture") was a ſcheme, of which the honour is due to *Thomas Firmin*, a moſt uſeful citizen in theſe reſpects. [c] But, before *Firmin*'s time, many other national improvements of the like kind, which have ſince been ſecretly purloined by modern authors, may be ſeen, at large, in a ſcarce curious pamphlet, publiſhed in the year 1668, under the title

[b] No people venture their wheat into the ground ſo late as the *Engliſh*. The *Spaniards*, *Italians*, and all the inhabitants along the coaſts of the *Mediterranean*, and in the iſles of the *Mediteranean*, ſow it in *September*, and the beginning of *October*. The *Germans* and *Flemings*, from the end of *Auguſt* to mid *October*, and the *French* uſually finiſh at the ſame time.

[c] *Some Propoſals for the Employment of the Poor*, by T. F. 4°. 1681, p. 80, &c.

title of England's Wants; *humbly offered to the consideration of all good patriots in both Houses of Parliament*: "Where the propoſer offers to contribute his utmoſt ſervice, and to be ready, whenſoever he ſhall be called by any committee appointed to debate or conſider any of the ſaid propoſals."

But to return from *public œconomics*, in general, to matters of agriculture.

It is certain, we have ſhewn more ſkill than our anceſtors, in the method of ſowing graſs-ſeeds *alone*, and not intermingling them with ſpring-corn: [c] As alſo in the hand-hoeing of turnips; which practice agrees perfectly well with the preſent opinion of looſening the earth, keeping plants clean, and giving them room. To theſe two improvements may be added the new treatiſe of introducing into the field all annual crops in rows, ſuch as ſavoys, winter cabbages, *German* or cabbage turnips, *&c.* for the better ſupport of cattle in winter: As alſo the art of horſe-hoeing; the improvements made by foreigners upon *Tull*'s inſtruments of huſbandry; the drill-rake of *M. Vandusfel*; the method of tranſplanting lucerne; and reſtoring old paſturages without laying them down in corn; as diſcovered and delivered to us by *M. de Chateauvieux*.

Upon the whole, "though it is certain that the antients and moderns have diſcovered much, yet it is no-ways certain they have diſcovered all." [d] — But one of the principal objects, in our new method of culture, is to recommend induſtry, neatneſs, and the extirpation of weeds, to all promoters of agriculture, in the ſtrongeſt terms; "for, the more the *huſbandman* thinks fit to imitate the practice of the *gardener*, in turning the ſoil and keeping the earth free from weeds, the better taſt-

[c] It were to be wiſhed this practice was more univerſal.

[d] *Hartlib*'s Legacy.

ed will his crops prove, and the more luxuriant: To his own private emolument in particular" (according to a remark of Sir *R. Weſton)* " as well as the advantage of ſociety in general."

Notwithſtanding I look with pleaſure upon *georgical* writings, compoſed by ſcholars bleſſed with fine parts and lively imaginations, yet, at the ſame time, I take not the leaſt offence at certain inaccuracies in ſtyle and *phyſical* knowledge, when I peruſe the huſbandry-writings of downright yeomen and farmers; whilſt, at the ſame time, more faſtidious critics may ſpare themſelves the pains of giving vent to their remarks, merely becauſe theſe plain ſenſible authors may never have heard who a critic is, nor would they regard him, if they heard his remarks.— The ΕΜΠΕΙΡΙΑ & ΑΥΤΟΨΙΑ [e] of *Dioſcorides* are an irrefragable anſwer to theſe holiday-obſervers.— Such a plain practical author, as *Gabriel Plattes*, pays his little contingent to the republic of knowledge with a bit of unſtamped real bullion, whilſt the vain-glorious man of ſcience throws down an heap of glittering counters, which are gold to the eye, but lead to the touch-ſtone.

As I have endeavoured to pay ſo much attention to experienced huſbandmen, of courſe, I have ſhewn no great attachment to thoſe ingenious writers whom foreigners juſtly ſtyle *agriculteurs du cabinet. Varro*, *Cato*, *Virgil*, *Columella*, and, perhaps, *Palladius*, were all perfect maſters of practical huſbandry; but ſorry I am, to remark, that ſo much cannot be ſaid of *Pliny* the naturaliſt (though he was very ſenſible of the fault here complained of [f]) nor of the *Greek geoponic* authors. Therefore, though I have cited them occaſionally, where more obſerving huſbandmen are ſilent, yet the reader is always deſired to call in the

[e] *Experience & ocular obſervation.*

[f] Philoſophis potius quam agricolis ſcripſiſſe poſſunt videri. Plin. *Nat. Hiſt.* L. xviii. c. 4.

the assistances of his own experience, in order to corroborate or invalidate many things they have asserted dispersedly through the course of their writings.

Indeed, the collector of the *geoponic* pieces (by some supposed to be *Cassian)* has made a very sensible apology upon this occasion, and we ought, in justice, to allow it full force: "Most relations of the superstitious and fabulous cast, says he, are delivered down to us from antiquity: And many of them deserve to be rejected as unworthy of belief; on this account, I exhort my readers to pay no regard or attention to them; since, for my own part, I only inserted them, for fear of being thought not to have read all that has been written upon the subject." [b]

The moderns, even in these more enlightened ages, have their superstitions, prejudices, and ignorances, in common with the antients. The terrors of the *hag* and *shrew-mouse* are not as yet totally eradicated from country minds in various nations. Our farmers still believe a *change of species* in grain after sowing: And some of them assert, that a field of corn will always be blasted, if a *barberry-tree* grows [c] in one of the hedges that surround it; nay, no longer ago than the year 1749, I saw three witches hanging on a gallows upon the banks of the torrent *Sanna*, [d] in the *Austrian* dominions,

[b] Ταῦτα μὲν εἰρηται τοῖς ἀρχαίοις. Εγὼ δὲ ἕνια τῶν εἰρημένων ἀπρεπῆ λίαν, ἡγοῦμαι, καὶ φευκτὰ καὶ πᾶσι παραινῶ μηδ' ὅλως τούτοις προσέχειν τὸν νοῦν. Τούτου γὰρ χάριν αὐτὰ συνέγραψα, ἵνα μὴ δόξω τι παραλιμπάνειν τῶν τοῖς ἀρχαίοις εἰρημένων.

Geopon. l. i. c. 14.

[c] The same notion prevails in *France, Culture des Terres*, tom. I. p. 98.

[d] The *Sanna*, about 4 miles to the south-east of *Cilley*, falls into the *Savus*, a river well known to the generality of readers. On account of its violence, rapidity, and frequent inundations, it is called, by the *Germans*, DIE SAW, or the *wild sow*, which terrifies

for having raiſed tempeſts and hurricanes during the time of harveſt (as the people alledged) inſomuch that the crop was almoſt totally ruined.—The *Swiſs*, though a well-meaning religious nation, think hemp will never proſper, except it be ſown on *Good-Friday*.

In the next place it has been found, by long experience, that ſome addreſs and management muſt be uſed, before you can make a convert of any common huſbandman, or wean him from his antient habitudes and prejudices. Therefore lead him into all improvements gently. Bear a part of his charges in a new experiment, and take care that he begins *in ſmall*. At firſt he may think meanly of your abilities in country affairs, and, like the groom and farrier, conceive a notion, that it is impoſſible for a gentleman to underſtand ſuch matters. Outward reſpect preſerved, he may, perhaps, laugh at you in private; as the *Roman* peaſants laughed at *Horace*, *glebas & ſaxa moventem*; and the good people of *Ithaca* (if old *De Serres* may be believed) thought *Ulyſſes* diſcompoſed in his intellects, when he ſowed ſalt by way of manure.—Or, which is ſtill ſtronger, and, perhaps, may be the real truth lurking at bottom,

rifies the huſbandman, and ruins great part of his labours. When I had ſeen the ravages made by this torrent (at leaſt, from *Laubach* to *Agram*, the capitals of *Carniola* and *Croatia*) I was almoſt induced to conclude, that the antient inhabitants had named this river *Die Saw*, in alluſion to the deſcription of the *Calydonian* boar in the ſtory of *Meleager*:

Sus erat, infeſtæ vindex, ultorque Dianæ.
Nunc matura metit fleturi vota coloni,
Et Cererem in ſpicis intercipit; area fruſtra,
Et fruſtra expectant promiſſas horrea meſſes.
Sternuntur gravidi longo cum palmite fœtus,
Baccaque cum ramis ſemper frondentis olivæ.
Sævit & in pecudes.
Diffugiunt populi, nec ſeſe in mœnibus urbis
Eſſe putant tutos.

OVID. MET. l. viii. v. 272, &c.

tom, the husbandman and the bailiff both know full well it is not for their interest that a gentleman should be intelligent in matters of husbandry.

Gentle usage, experience, and profit, will soon bring men into better dispositions: But, be careful, they never discover that you have a sovereign contempt for their notions and practice in agriculture: For this will frustrate the effect of all your good lessons at once. Therefore, in the present case, nothing but time, kind persuasions, and matter of fact, can bring about a change of opinions.—We may observe farther, that it is not unreasonable to hope, and, at the same time, natural enough to conclude, from the *present* and *future* necessity of things, that agriculture will soon be better understood by us, and make considerable advances: Especially amongst that valuable set of men, *the country gentry of moderate estates*; who are the main support of every kingdom, and formerly abounded more in this country, than in half *Europe*. In antient times, the same estates kept in the same family for a great number of years; but the misfortune, at present, is, that the transitions of property are over rapid, and too many family seats have changed their owners:

——*Veteres jam migravêre coloni.*

Of which the principal causes seem to be these that follow: An ignorance in country gentlemen (even to affectation) concerning the nature and culture of their own lands, their only true and real support:[b] A love for shew and expence beyond their circumstances; and a vain attempt to rival a set of peo-

[b] It was *Pliny*'s opinion, that a man of fortune ought to be looked upon as unhappy, who had a country-seat, and no estate round it: *Villa Luculli agro caret.*

Nat. Hist. l. xviii. c. 6.

ple grown rich by manufactures and commerce, and opulent in treasures deposited in public reservoirs, where the payments are periodical and certain, without the deduction of land-tax, [c] poor's rates, repairs, *&c.*—Happy are those, whose annual income is not liable to be affected with inclemency of seasons, losses, or frauds from tenants, or a circumstance equally mortifying, which is having sometimes no tenants at all! Almost every thing can hurt the land-holder, [d] and only few things hurt the moneyed possessor.

It

[c] "All taxes fall chiefly on the landed interest.—For every new tax the consumer must be raised one quarter in the price of the things taxed. It is plain the merchant, tradesman, or manufacturer, neither can, nor will pay this: For, if he pays a quarter more for commodities than he did, he will sell them at a price proportionably raised. The poor labourer and handicraft's-man cannot: For he just lives from hand to mouth already, and all his food, cloathing, and utensils, costing a quarter more than they did before, either his wages must rise with the price of things, to make him live; or else, not being able to maintain himself and family by his labour, he comes to the parish, and then the land bears the burthen a heavier way. If the labourer's wages be raised in proportion to the increased rates of things, the farmer who pays a quarter more for wages, as well as all other things, whilst he sells his corn and wool either at the same rate, or lower, at the market (since the tax laid upon it makes people less forward to buy) must either have his rent abated, or else break and run away in his landlord's debt: And so the yearly value of the land is brought down. And who then pays the tax at the year's end, but the landlord?" *Locke's Considerat. on lowering Interest*, p. 29.

"When a nation is running to decay and ruin, the merchant and monied man, do what you can, will be sure to starve last." *Idem*, vol. II. p. 27.

[d] "Taxes however contrived, and out of whose hand soever immediately taken, do, in a country where the great fund is land, for the most part terminate upon land. *Whatsoever* the people is *chiefly maintained by*, *that* the government supports itself on. Nay, perhaps, it will be found, that those taxes which seem least to affect land, will, most surely of all others, fall the rents.—And, tho' the land-holder pays not this tax immediately out of his own purse, yet his purse will find it by a greater want

It was partly with a view to promote the well-being of such country gentlemen as have been above described, and another valuable class of people, called the *yeomanry*, that these ESSAYS were composed; and here it is only to be wished, that men would come into the study and improvements of husbandry, merely from choice, and a principle of good sense and œconomy, instead of being compelled to do so one time or other by the urgency of their affairs, since, *then*, their attempts will be always languid, and, perhaps, insufficient to remove the distemper. It is too late to understand agriculture, when the land is gone, or going, upon which that art ought to be employed. Nay, the knowledge of it, at such a time, will afford nothing more than the poor consolation, which *Face* mentions in the alchemist, who, when the laboratary was blown up, and all visionary hopes evaporated, comforted himself and comrade with saying, "*That there was just mercury enough left to cure the itch.*"

At the same time that we advise country gentlemen to study agriculture, we desire them likewise, not to consider it as an illiberal or servile employment,

want of money, at the end of the year.—This is a settled and lasting evil that will stick upon him beyond the present payment." *Locke, ut supra*, vol. II. fol. p. 27.

"In all countries, whose fund is land, the public charge of the government will be laid upon land, and nothing else: There, at last, it will terminate. The merchant, *&c.* do what you can, will not bear it; the labourer cannot; and therefore the land-holder must.—Lay the taxes how you will (and that even in *Holland*, so famous for trade) the land every-where bears the greater share of the burthen." *Ibid.* p. 29.

Whenever a nation declines from its antient prosperity, the land-holder feels the first symptoms of disorder, then the labourer, artist, and under-workman, and, lastly, the trader, the monied man, and the merchant. In this consists the difference; all suffer: Some a little sooner, and others a little later.

Ibid.

ment, for that would be to contradict the opinion and practice of all great, wise, and polite persons in antient ages; but one caution we beg leave to lay down as indispensably requisite towards explaining our meaning and intention throughout these Essays, which is, that above all things *they* hurt not their fortunes by extensive undertakings, or chimerical projects, at first setting out.——That not only self-opinion and private conjecture, but even reason, chemistry, and natural philosophy should become the disciples of *experience*.[e]—And that all experiments ought to be verified first *in small*, as well as repeated often, before men proceed to make attempts *at large*.

Agriculture would soon carry another aspect in this kingdom, if every gentleman were a true rural œconomist, according to the sense of the antient writers on husbandry: That is, if he applied himself seriously to understand the nature, as well as the different species of lands which he possesses, in order to prepare rightly his arable and pasture fields for the reception of such grain or grass-seeds as he purposes to cultivate, and, at the same time, knows when and how to apply those manures that are peculiarly adapted to the wants and demands of the soil. In particular also, he ought to understand the nature of his grasses and hay, in order to give each beast that food which is most nourishing, as well as most agreeable to its kind; till, at length, he acquires a degree of experience and knowledge, which will prove, upon the whole, a safe guide, and but rarely fallible.—From that moment he emancipates himself (almost as far as lies in his power, in the present instance) from false maxims, prejudice, the force of custom, and influences of other men in matters of husbandry.

It

[e] XENOPHONT. *Oeconom.* c. 12. sect. 3, 4.

It is hardly poſſible, but that a gentleman muſt loſe by huſbandry, except he underſtands it: For, in caſe he is not ſo happy as to be maſter of the buſineſs, he plays with ſharpers, and ſuffers accordingly.—But the affair of gentlemens being prime managers of their own eſtates in hand, without placing much truſt in bailiffs or ſervants, ſhall be conſidered, more at large, in the introductory part of the next ESSAY. I will therefore, in this place, only mention one authority drawn from great antiquity.

Xenophon, in his *Treatiſe of Oeconomics* (which I take to be one of the plaineſt and moſt ſenſible performances amongſt the writings of the antients (tells us it was a fixed rule, with one of the beſt huſbandmen we have upon record, to be, as it were, the ſchool-maſter of his own bailiff.——"When you ſtand in need of a good ſubſtitute and manager in huſbandry-affairs," ſays *Socrates* to *Iſchomachus*, "do you, as in matters of architecture, *&c.* attempt to procure the moſt ſkilful perſon you can hear of in that way, or do you inſtruct ſome one of your own people, to the beſt of your judgment?" "*Good Socrates*," anſwered *Iſchomachus*, "*I endeavour to teach them myſelf.* For the man, to whom I thus entruſt the management of my affairs, will know better, in my abſence, how to carry on every work to my liking, than one who already ſuppoſes himſelf a maſter of all that I want to ſee performed. And, as it appears to me, that I have experience ſufficient to ſet men to work, and conduct them through the progreſs of that work, I therefore conclude I am able to teach a perſon what I can do myſelf." [a]

But the laſt argument our author touches upon, is a very important one: "It is impoſſible," ſays he, "but upon ſome occaſions we muſt call in the aſſiſ-

[a] XENOPHONT. *Oeconom.* c. 12. ſect. 3, 4.

assistances of others; but, upon the whole, it is indispensably necessary to understand agriculture in our own persons, for we can never instruct a man to use the same diligence for another, that he would for himself."

However, it may not be amiss to remember, that, when any considerable improvements are made by a farmer, we are often persuaded to raise his rent too soon, and, like eastern monarchs, tax his industry, and punish him for growing wealthy. This is unkind, as well as impolitic usage: For, the more such an husbandman gains, the more, generally speaking, he becomes vigilant, frugal, and industrious. In proportion as the farmer thrives, the land improves: And this is the meaning of the *French* proverb, *Tant vaut l' homme, tant vaut la terre.* Such a man, being once placed above the reach of want, has the means of hiring better servants, and maintaining a larger stock of cattle;—making or purchasing manures;—trying experiments, or devising improvements. In proportion as he cultivates more land, he acquires more knowledge, and gains greater profit: Till, at length, he begins to love husbandry, and values himself on a profession which increases his little store, and gratifies his vanity into the bargain. Under such a cultivator, you see, in one place, waste lands rendered arable, or converted into artificial pastures; this is a true conquest: An acquisition and appropriation, which enriches his landlord and himself, but injures no man! In another place he fertilizes a parched soil by floating it, or bringing little streams to run through it, feed, and cloath it with wholesome verdure; or else drains morasses, where abundance of the same water is a nusance, and decorates the soil with rich crops of useful vegetables, as flax, hops, cole, rape, *&c.* instead of flags, moss, rushes, and brambles.—Such a tenant ought to be patronized,

nized, and not discouraged. For every estate, *brought thus into heart* (as the countryman expresses it) may be continued on the same, or a like footing, easily and cheaply, for a considerable number of years. So that the rent of the estate, when occupied by another, at this man's death, may be increased, in all probability, 10 *per cent.*

It is therefore of dangerous consequence to persuade great men, ministers, and princes, that poverty is advantageous to poor farmers, and that want and distresses animate their activity; that necessity will make them docile and tractable, and that they may pass through the stage of life best, when they are laden with the heaviest burthens; whereas it is well known, that the poor husbandman can steer his course successfully enough without carrying such a weight of ballast.

Let us therefore charitably place this matter in another light, and, if farmers, who literally support the heat of the day, are so unhappy as not to share the esteem of the nobility and gentry, yet they have a claim, at least, to the favour of ministers, and the protection of princes; for, though there may be subjects of more conspicuous talents, yet two thirds of mankind will be found less useful to society.

In the next place, it may appear, by various remarks traced from the fountain's head, and supported by testimonies and authorities, that the kingdoms of *England*, *France*, *&c.* have made fewer husbandry improvements, for one hundred and fifty years past, than one is apt to imagine at first sight. This hint has been suggested by us already, and several opportunities shall be taken to enforce it occasionally.

In

In a word, it is my private opinion, that agriculture is, and ever will be, in an improvable ſtate: [b] And ſure the importance of the ſubject becomes underſtandings that are by a thouſand degrees ſuperior to mine; for men of the very firſt rate genius, in all ages, have written on huſbandry.—

Varro, who flouriſhed before *Virgil*, recounts, in the Epiſtle Dedicatory to his wife *Fundania*, fifty proſe-writers upon that art (whoſe works were then extant) and two poets, namely, *Heſiod* and *Menecrates*; not to mention (continues he) the immenſe work of *Mago* the *Carthaginian*, written in the *Punic* language, but tranſlated into *Greek* by *Caſſius Dionyſius* of *Utica*, and abridged afterwards in ſix books, for the uſe of king *Deiotarus*.

In behalf of my own Eſſays, I ſhall not preſume to ſay a ſingle word. If they are good, they will work their own way ſooner or later; if they are bad, nothing can defend them. Beſides, every apology, made by authors, is little more than arming an ill-natured critic to their diſadvantage.

I had two principal intentions in writing this and the following Eſſay. The *firſt was* to exhort the inhabitants of my native country to carry on and maintain *that* ſuperiority in huſbandry, which they have hitherto poſſeſſed without a rival; and continue to advance, in proportion as our buſy neighbours, the *French*, are emulous to overtake us: And the rather, as we muſt all be ſenſible, that induſtry, in agriculture, will render all nations more happy, populous, wealthy, and virtuous.

My *ſecond* intention was to try, if it were poſſible, to enrich the poor honeſt induſtrious huſbandman; and that particularly in the culture of lucerne. My attempts in this reſpect (in regard to them) have

[b] *Multum adhuc reſtat operis, multumque reſtabit*; nec ulli nato poſt mille ſæcula præcluditur occaſio *aliquid adjiciendi*.

PLIN.

have not hitherto anſwered the earneſtneſs of my wiſhes: For, after various and repeated trials, it is to be feared, from the very nature of the plant, that more induſtry and expence are required, than ſuch perſons are willing, or able to give. But, at the ſame time, there is good reaſon to hope, that future cultivators (with greater ſkill, and with the ſame kind intentions) may happily hit upon ſome expedient, which may effectuate, with cheapneſs and facility, what I have hitherto in vain ſought for.

I have ever looked upon the poor laborious huſbandman, as a moſt uſeful being in all ſocieties; and happy would it be, if we could contribute to enrich him and the land-poſſeſſor at the ſame time; which muſt always happen, if huſbandry be carried on in the manner it *ought* to be. I am here ſpeaking chiefly of the loweſt claſs of huſbandmen, the little farmers, who rent 30 or 40 *l.* a year. Such a man works and fares harder, and is, in effect, poorer than the day-labourer he employs. An huſbandman, thus circumſtanced, is, beyond diſpute, a worthy object of our commiſeration and aſſiſtance. He is an uſeful, though inviſible, wheel in the machine of ſtate.

Venerable *Thomas à Kempis* goes farther upon this article; *the poor huſbandman*, ſays he, *who lives honeſtly, and cultivates his land induſtriouſly, is better than a proud philoſopher, who neglects himſelf and ſtudies the motions of the heavenly bodies*. Or, as the paſſage has been imitated by a modern hand:

The *men of ſcience* aim themſelves to ſhow,
And know juſt what imports them not to know;
Whilſt the *poor peaſant*, that with daily care
Improves his lands, and offers Heav'n his pray'r,
With conſcious boldneſs may produce his face
Where proud philoſophers ſhall want a place.

Modern

Modern writers in agriculture, far from poſſeſſing the genius of *Virgil*, have neither his patience nor perſeverance; for he, who had no equal in husbandry-writings (either as to matter or elegance of compoſition) employed ſeven years in compoſing and completing his *Georgics*, which, as ſome have computed, was almoſt the ſame thing, as if he had ſet aſide a day for the finiſhing of each line. "Now, though the poets of the preſent age", ſays *Dryden*, "were to take the ſame pains, yet they can never expect the ſame immortality."——Nay the very language they write in, will not admit ſuch ſort of perfection. *He* built with marble, and they are obliged to uſe a crumbling, periſhing kind of ſtone. But, without taking in ſuch conſiderations, what *Paterculus* ſays of *Homer*, as an Epic-writer, may be applied to *Virgil* as a writer of *Georgics: Nec ante illum, quem imitaretur, neque poſt illum qui eum imitari poſſit, inventus eſt.*

Let the praiſe therefore of truly correct and ſpirited writings, in matters of husbandry, remain intirely in the poſſeſſion of *Virgil* without a rival. —True it is, that we moderns may copy his induſtry, but can hardly expect, that one glimpſe of his genius will ſhine upon us. *Statius* has expreſſed our ſentiments upon this occaſion, both with reſpect to poets and writers on agriculture; and has told us the moſt that can be expected, which is only the little ambition of hoping to do well. His words are theſe in his epiſtle to *Marcellus:*

——*tenues ignavo* pollice chordas
Pulſo, Maroneique ſedens in margine templi
Sumo animum, & magni tumulis accanto magiſtri.
SYLV. lib. iv.

Columella

Columella [a] and *Cowley* [b] were poets likewiſe, and have written on agriculture, without being equalled by any moderns, in point of judiciouſneſs, exactneſs, and preciſion. For truth, in maſterly hands, will always be truth, whether it be delivered in verſe or proſe; with this recommendation added in the former inſtance:

Gratior eſt pulcro veniens de corpore.——

Men of a caſt and genius like the authors laſt mentioned are generally fond of country-retirements and ſolitude, and thus gain frequent opportunities of obſerving diligently the vegetable world. Thus *Virgil* in particular proceeds purely upon matter of fact, if we except the equivocal generation of bees in the fable of *Ariſtæus* [c]; for in truth he had fund enough to work upon from his own obſervations and experience [d]: Whilſt *Pliny* and others entertain us with little more than anecdotes and hear-ſays.

Virgil was certainly a true maſter of practical agriculture: For he cultivated his own eſtate, till he was thirty years old. The firſt bent of his genius led him to husbandry, and in all probability the ſolitude and contemplation that attend ſuch a life called forth his poetical powers. And

[a] Lib. x de Hortis.

[b] De Plantis.

[c] It was currently believed by men of the beſt ſenſe in *Virgil*'s time, that bees were of equivocal generation. *Ovid* records it in (what I had almoſt called) the divine ſpeech of *Pythagoras*; and again mentions the fact in his own perſon.

Faſt. lib. ii.

The paſſage firſt alluded to is as follows:

——— Mactatos obrue tauros,
(Cognita res uſu eſt) de putri viſcere paſſim
Florigeræ naſcuntur apes.—— *Met.* lib. xv. 364.

[d] Hence *Columella* calls him Vatem VERISSIMUM, velut *Oraculum*. *De Re Ruſt.* lib. i. c. 4.

And here it must be acknowledged, that his countrymen have ever paid him due honours (and that with the most accurate distinction) not only as a *poet*, but as an *husbandman:* For his *Georgics* to this very day are the ground-work of all *Italian* agriculture, and his rules and precepts are followed (traditionally at least) by those who never read him, or heard of him. It is no-ways likely that he pitched on so humble a subject, with a view of displaying his superior talents in poetry; nor am I inclined to think, that he thought *Hesiod* so formidable a writer, as to be ambitious of eclipsing him: It rather seems probable, that he writ the *Georgics* from *a sincere desire to serve his country*,[c] at a time when intestine wars had thrown a damp upon agriculture; difficulties and discouragements bringing about disuse, till (which is natural enough) the art itself fell into neglect and contempt. Nor is it improbable, but that *Mæcenas*, who was a better politician than most people imagine, encouraged his poet in this undertaking.——

But, setting aside the last consideration as partly conjectural, the *same causes* produced the *same effects* in our country. The civil wars, during the reign of *Charles* I, brought agriculture first into distress, and then into disesteem: But, the moment the fury of bloodshed ceased, a set of first-rate writers started up at once, not by compact, but (as it were) by natural instinct, in behalf of expiring agriculture. Nor have these authors been equalled since that period: Such, for instance, were *Hartlib*, *Plattes*, *Child*, *Beati*, *Blythe*, &c. *Cromwell* seized the lucky incident, and, as far as a certain penury of temper would allow him, was a *Mæcenas* too, for he bestowed a pension on *Hartlib*, and was generous, I believe, to some other husbandry-writers. In so doing he gained popularity like a man of parts, and, at

[c] *Ignarosque viæ mecum miseratus agrestes.* Georg. I. v. 41.

at the same time, proved serviceable to the nation *at least in this particular.*

As the poets (agreeably to what has been before remarked) have expressed themselves so fortunately on several points of husbandry, I have extracted many passages from some of the most antient among them, as *Hesiod*, *Homer*, *Lucretius*, *Virgil*, &c. but then they are passages that relate intirely to agriculture, and perhaps may be found to be more concise and elegant than if they had been delivered in prose. That they are as *true* may be safely asserted.—New translations also are frequently substituted by us in the place of old ones; not from a vanity of writing verses, but merely to make the sense of the original intelligible, where it was of an instructive didactic nature. For some of the best poetical translators may happen, with all their knowledge of the fine arts, to be quite ignorant in matters of husbandry; of which we have seen numberless instances in the versions of *Virgil's Georgics*; nor can we except here the translation made by the *Great* DRYDEN *Himself*. And if the translator here spoken of had submitted his performance to the examination of an *Italian* husbandman (had *that* been possible) or even to the revisal of some plain *English* yeoman, instead of referring himself to professed wits and critics, the poetry of *our English Georgics* might have been a masterpiece of truth, as well as fine writing.

As to what is called the NEW HUSBANDRY, I have in many instances recommended it strenuously, adding only here and there a few diffuasives upon some particular occasions; and *that*, for a plain reason assigned by *Varro*, *Ne*, *in ea re, sumptus fructum superet.*—On this last account, I have been fearful of recommending *it universally* for the culture of corn: Yet, at the same time, it is incumbent on me to acknowledge, that I would al-

ways prefer *drilled* corn for *ſeed*; as the plants will have enjoyed more ſpace, air, and ſunſhine, and the grain will be larger, healthier, and ſtronger. Bread particularly from *drilled* wheat will be better taſted than from wheat raiſed by random-ſowing: The crop alſo at the ſame time being leſs infeſted with weeds—But, in the other parts of huſbandry, relating to the food of cattle, I would recommend *drilling* or *tranſplanting*, as occaſion requires, in the culture of lucerne particularly, ſainfoin, turnips, burnet, carrots, trifolium fibrinum, fenugreek, (*Roman*;) falſified cytiſus, ſweet melilot, and many other wholeſome, well-taſted plants mentioned in my POSTSCRIPT.

Men, through the force of prejudice and cuſtom, entertain unreaſonable apprehenſions of the difficulties, expences, and minute attentions that belong to the *New Huſbandry*; but a few ſlight ſhort trials will ſoon reconcile them to the practice of it: *Machiavel*'s obſervation being as true in husbandry, as in politics; namely, "That things which *ſeem to be, and are not*, are more feared afar off, than when they are *near at hand*, or *actually experienced*."

Some perhaps may imagine, that we have introduced too many paſſages from Scripture into theſe eſſays; but the truth is, we were deſirous to interſperſe ſome few important hints of a ſerious caſt, and render theſe diſcourſes on husbandry (incidentally at leaſt, and ſo far as lay in our power) THE GEORGICS OF THE MIND, as Lord *Bacon* expreſſes himſelf [b].

St. *Paul* has a very remarkable expreſſion upon this occaſion: *We are* ALL GOD'S HUSBANDRY. 1 COR. iii. 9. Or, as the Supreme Being ſays elſewhere, with peculiar emphaſis, MY *vineyard, which is* MINE, *is before me.* CANT. viii. 12. *I, the Lord, do keep it; I water it every moment; leſt any*

[b] *De Augment. Scient.* lib. vii. c. 10. p. 196. folio.

any hurt it, I will keep it night and day. ISAI. xxvii. 2, 3. *And now, O inhabitants of* Jerusalem, *and men of* Judea, *judge, I pray you, between me and my vineyard; what could have been done more to my vineyard, that I have not done in it?* JER. xxxii. 41.

I will add farther, that the fine images drawn from agriculture in the sacred Writings are innumerable; and the georgical history of *Boaz*, *Ruth*, *Naomi*, *Orpah*, &c. is a finer and more beautiful rural picture than is to be found in the episodes of *Virgil*. It is, in a word, a perfect *drama*: Being, according to the rules of *Aristotle*, "a natural representation of interesting events, *acted, and not spoken* [c]."

Again, it may suffice to observe, that the drift and moral of these essays (and whatever else may be written by us upon the principles of the New Husbandry) is uniformly one: Namely, "That God, in consequence of the fall of man, has made the chief success of agriculture to depend upon industry."

"The *industry* of agriculture is made the vehicle in Scripture of conveying to the mind every other sort of diligence of a more important nature.

It has been observed, that the very word made use of for *ploughing*, in the *Hebrew* text of the Old Testament, signifies, at the same time, *attention* and *labour* [d]. And hence, in all probability, was taken that remarkable expression in St. *Luke: No man, having put his hand to the plough, and looking back, is fit for the kingdom of heaven.* Chap. ix. 62.

This repeated industry seems to be inculcated by the prophet *Isaiah: The ploughman plougheth all day to sow; he openeth and breaketh the clods of his ground. When he hath made plain the face thereof,*

[c] *In Poetic.*

[d] See *Flavel's Husbandry spiritualized*, 10th edit. p. 83.

doth he not caſt abroad the fitches, and ſcatter the cummin, and caſt in the principal wheat, and the appointed barley, and the rye in their place? Chap. xxviii. 24, 25.

It may be remarked laſtly, That all the ethic writers on husbandry, put together, have not given us ſuch a picture of *induſtry* and *plenty*, as may be ſeen in three or four ſtrokes only ſketched out to us by the poor *herdſman* of *Tekoah*: *Behold, the days come, ſaith the Lord, that the ploughman ſhall* OVERTAKE *the* REAPER, *and the* TREADER *of* GRAPES HIM *that* SOWETH SEED. *The mountains ſhall drop ſweet wine, and all the hills ſhall melt.* —*My people ſhall build the waſte-cities and inhabit them, and they ſhall plant vineyards, and drink the wine thereof; they ſhall alſo make gardens, and eat the fruit of them.* AMOS ix. 13, 14.——*Every thing where the river* (of induſtry) *cometh ſhall thrive; but the miry places thereof, and the marſhes thereof, ſhall never be healed, but be given to ſalt,* (that is, ſhall be deemed barren.) EZEK. xlvii. 9. 10."

The induſtrious man's fields may be compared to the fleece of *Gideon* [b]. His lands are a paradiſe of neatneſs and plenty, refreſhed here and there with artificial canals; whilſt every thing that lies beyond the circle of his boundaries is confuſed, parched, and barren.

" Under the firſt law, in the prohibitions concerning food, the ſupreme Legiſlator rejected the *ſnail* and the *aſs*, LEV. xi. 30. and there are not wanting writers who ſuppoſe this reſtriction to be partly emblematical; becauſe theſe animals are emblems of ſluggiſhneſs and ſtubbornneſs.—The neglected productions from the fields of the ſlothful and unthrifty *are like trees whoſe fruit withereth, or like trees without fruit; twice dead, plucked up by the*

[b] JUDG. vi. 37, 38.

the roots. Jude v. 12. Whilst, on the contrary, under the hands of an industrious cultivator, *the wilderness and solitary place shall be glad for him, and the desart shall rejoice and blossom like the rose. It shall blossom abundantly, and rejoice even with joy and singing. The glory of* Lebanon *shall be given unto it, the excellency of* Carmel *and* Sharon. Isaiah xxxv. 1, 2."

——Pater ipse colendi
Haud facilem esse viam voluit, primusque per artem
Movit agros, curis acuens mortalia corda.
Virg. Georg.

——Genuit Tellus eadem quæ nunc alit ex se;
Prætereà nitidas fruges, vinetaque læta
Sponte sua primum mortalibus ipsa creavit.
Ipsa dedit dulceis fœtus & pabula læta,
Quæ nunc vix nostro grandescunt aucta labore;
Conterimusque boves & vires agricolarum:
Conficimus ferrum vix arvis suppeditati;
Usque adeo pereunt fœtus, augentque labores.
Jamque caput quassans grandis suspirat arator
Crebrius incassum magnum cecidisse laborem:
Et cum tempora temporibus præsentia confert
Præteritis, laudat fortunas sæpe *parentum.*
Lucret. Lib. II. v. 1155.

ESSAY II.

AN

Account of some Experiments

Tending to improve the

Culture of LUCERNE:

BEING

The first Experiments of the Kind that have been hitherto made and published in England.

From whence it appears

That Lucerne is an Article of great Importance in Husbandry.

Κῆν με φάγῃς, ——— ὅμως ἔτι καρποφόρησω.

Anthol.

O mihi *bis senos* multum vigilata per annos.

Thebai. Stat.

Παρακαλῶμεν δὲ τοὺς ἐντυγχανομένους τοῖς ΥΠΟΜΝΗΜΑΣΙ τούτοις, μὴ τὴν ἐν λόγοις ἡμῶν δύναμιν σκοπεῖν, ἀλλὰ τὴν ἐν τοῖς πράγμασι μετ' ἐμπειρίας ἐπιμέλειαν· μετὰ γὰρ πλείστης ἀκριβείας τὰ μὲν πλεῖστα δι' αὐτοψίας γνόντες.

DIOSCORID. Lib. i.

TESTIMONIES

CONCERNING

LUCERNE.

I.

VIRGILIUS de *Medica.*

VERE fabis ſatio, tunc te quoque *medica* putres
Accipiunt ſulci.——

GEORG. I. v. 215.

[a] MARCUS VARRO de *Medica.*

De *medica* in primis obſerves, ne in terram nimium aridam, aut variam, ſed temperatam ſemen demittas. In jugerum unum, ſi eſt naturâ temperata terra, ſcribunt opus eſſe *medicæ* ſeſquimodium. Id ſeritur ita ut ſemen jactatur, quemadmodum ſcilicet cum pabulum & frumentum ſeritur.

De Re Ruſt. Lib. i. c. 41.

II.

[b] COLUMELLA de *Medica.*

Ex iis (pabulorum generibus) quæ placent, eximia eſt herba *medica*; quòd cum *ſemel* ſeritur *decem annis* durat: Quòd per annum deinde rectè *quater*, in-

[a] This account was written about 20 years after the birth of Chriſt.

[b] *Columella* compoſed his work in the reign of *Claudius*, about 50 years after the birth of our Saviour.

interdum etiam *sexies* demetitur: Quòd agrum ſtercorat: Quòd emaciatum animal ex ea pinguefcit: Quòd ægrotanti pecori remedium eſt: Quòd jugerum ejus toto anno tribus equis abunde ſufficit. Seritur ut deinceps præcipiemus.——

Cum ſic terram ſubegeris, in morem horti areas latas pedum denûm, longas quinquagenûm facito, ut per ſemitas aqua miniſtrari poſſit; adituſque utraque parte runcantibus pateat: Deinde *vetus* ſtercus injicito, atque in menſe ultimo Aprilis ſerito tantum, quantum ut ſinguli cyathi ſeminis locum occupent decem pedum longum & quinque latum: Quod ubi feceris, ligneis raſtris (id enim multum confert) ſtatim jacta ſemina obruantur, nam celerrime ſole aduruntur. Poſt ſationem ferro tangi locus non debet. Atque ut dixi ligneis raſtris ſarriendus, et identidem runcandus eſt, ne alterius generis herba invalidam *medicam* perimat. Tardius meſſem primam ejus facere oportebit, cum jam ſeminum aliquam partem ejecerit. Poſteaquam voles teneram, cum proſiluerit, deſſeces licet, & jumentis præbeas, ſed inter initia parcius, dum conſueſcant, *ne novitas pabuli noceat:* Inflat enim, & multum creat ſanguinem; cum ſecueris autem, ſæpius eam rigato. Paucos deinde poſt dies, ut cœperit fruticare, omnes alterius generis herbas eruncato. Sic culta SEXIES in anno demeti poterit, & permanebit ANNIS DECEM.

De RE RUST. Lib. ii. c. 11.

III.

[c] PLINIUS *de Medica.*

Medica externa etiam Græciæ, ut a Medis advecta [d] per bella Perſarum quæ Darius intulit: Sed vel in primis dicenda. Tanta dos ejus eſt, ut cum uno

[c] *Pliny* the elder writ about 70 years after the birth of *Chriſt*.

[d] Thoſe who are more curious to know from whence lucerne firſt came, may conſult *Theophraſtus de Plantis*, lib. viii. c. 8.

uno ſatu amplius quam xxx annis duret. Similis eſt trifolio, caule foliiſque geniculata: Quicquid in caule aſſurgit, folia contrahuntur.—Solum in quo ſeratur, elapidatum purgatumque ſubigitur autumno: Mox aratum & occatum integitur crate iterum & tertium, quinis diebus interpoſitis, & ſimo addito. Poſcit autem ſiccum, ſuccoſumque, vel riguum. Ita præparato, ſeritur menſe Majo, aliàs pruinis obnoxia. Opus eſt denſitate ſeminis omnia occupari, internaſcenteſque herbas excludi. Id præſtant in jugera modia xx; cavendum ne adurat, terraque protinus integi debet. Si ſit humidum ſolum herboſumque, vincitur & deſciſcit in pratum. Ideo protinus altitudine unciali herbis omnibus liberanda eſt, manu potius quam ſarculo. Secatur incipiens florere, & quoties refloruit. Id ſexies evenit per annos; cum minimum, quater. In ſemen matureſcere prohibenda eſt, quia pabulum utilius eſt uſque ad trimatum. Verno ſeri debet, liberarique cæteris herbis: Ad trimatum, marris ad ſolum radi. Ita reliquæ herbæ intereunt, ſine ipſius damno, propter altitudinem radicum. Si evicerint herbæ, remedium unicum eſt aratio, ſæpius vertendo, donec omnes aliæ radices intereant. Dari non ad ſatietatem debet, ne deplere ſanguinem neceſſe ſit: Et viridis, utilior. Areſcit ſurculoſe, ac poſtremo in pulverem inutilem extenuatur. De cytiſo, cui & ipſi principatus datur in pabulis, affatim diximus inter frutices. [e]

HIST. NATURAL. Lib. xviii. c. 16.

IV.

[f] DIOSCORIDES de *Medica.*

Μηδικὴ ἔοικε μὲν ἄρλι φυομένη τριφύλλῳ τῇ ἐν χορτοκοπίοις· προάγουσα δὲ ςενοφυλλοτέρα γίνεται, καυλὸς ἀνιεῖσα

[e] "Of this herb *(medica)* alone, and cytiſus, *Amphilochus* compiled one whole book." PLINY, *ibid.*

[f] *Dioſcorides* flouriſhed about the ſame time with *Pliny* the elder.

εἶσα τριφύλλῳ ὁμοίας, ἐφ' οἷς τὸ σπέρμα προσέφυκε φακῷ τὸ μέγεθος, ἐπεσταμμένον ὡς κεράτιον· ὅπερ ξηρανθὲν, μίγνυσθαι ἡδύσμασί τε χάριν τοῖς ἁλυροῖς ἁλσί. Χλωρὸν δὲ καταπλασθὲν ὠφελεῖ τὰ ψύξεως δόμενα. Ὅλη δὲ τῇ πόᾳ χρῶνται οἱ κτηνοτρόφοι ἀντὶ ἀγρώστεως.

Βιβλ. Β. κεφ. ροζ.

"Medica cum recenter prodiit, foliis & caule "trifolio [pratenſi] ſimilis eſt, procedens vero folia "contrahit, caules edens trifolii, & ſiliquas corni- "culorum modo intortas, in quibus ſemen lentis "magnitudine dependet. Id ſiccatum, jucundi "ſaporis gratia conditaneo ſali admiſcetur.—Herba "tota pro gramine utuntur qui pecora alunt."

Ruellio Sueſſionenſi Interpr. 1549.

V.

PALLADIUS, de agris *medicæ* parandis.

Nunc (ſcil. menſe Februarii) ager qui accepturus eſt *medicam* (de cujus natura cum erit ſerenda dicemus) iterandus eſt, & purgatis lapidibus diligenter occandus, & circa Martias calendas, ſubacto ſicut in hortis ſolo, formandæ ſunt areæ, latæ pedibus X. longæ pedibus L. ita ut eis aqua miniſtretur, & facile poſſint ex utrinque runcari. Tunc injecto *antiquo* ſtercore in Aprilem menſem reſerventur paratæ.

De Re Ruſt. lib. iii. tit. 6.

IDEM, de *medica* ſerenda, et diſciplina ejus.

Aprili menſe, quas ante ſicut diximus, præparaſti, *medica* ſerenda eſt. Quæ ſemel ſeritur *decem* annis permanet, ita ut *quater* vel *ſexies* per annum poſſit recidi. Agrum ſtercorat, macra animalia reficit, curat ægrota. Jugerum ejus toto anno III. equis abunde

abunde ſufficit. Singuli cyathi ſeminis occupant locum latum pedibus quinque, longum pedibus decem. Sed mox ligneis raſtellis obruantur jacta ſemina, quia ſole citius comburuntur. Poſt ſationem ferro locum tangi non licet, ſed raſtris ligneis frequenter herba mundatur, ne teneram medicam premat. Prima meſſis ejus tardius fiet ut aliquantum ſemen excutiat: cæteræ vero meſſes quam volueris cito peragantur, & jumentis præbeantur. Sed prius parcius exhibenda eſt novitas pabuli, inflat enim & multum ſanguinem creat. Ubi ſecueris, ſæpius riga. Poſt paucos dies cum fruticare cœperit, omnes alias herbas runcato. Ita & *ſexies* per annum metis & annis X, poterit manere continuis.

De Re Ruſt. lib. v. *Menſ. April.* tit. 1.

VI.

DIDYMUS.

Lactantes boves cytiſo aut *medica* nutriemus: ſic enim connutritæ plus lactis habebunt.

Geopon. lib. xvii. c. 8.

VII.

DEMOCRITUS.

Bobus ægrotis prodeſt *medica* herba.

Ibid. lib. eod. c. 14.

VIII.

MATTHIOLIUS de *Medica*.

Hæc quondam in univerſa Italia ſerebatur ad pecorum pabulum.——& (ut Plinius tradit. lib. xviii. c. 16.) uno tantum ſatu plus tricenis annis perdurat. Eadem, ut quidam referunt, abundat in Hiſpania, ubi magna admodum cura colitur ad jumentorum & pecorum pabulum; eamque alfalfam vocant,

vocant, nomine ab Arabicis corruptè mutuatò.
Matthioli in Dioſc. p. 330. fol. edit. 2. Lugd. 1562.

IX.

M. Agostino Gallo *nella Seconda Giornata dell' herba Medica.*

Voi non potevate chiedarmi coſta piu grata che il ragionar di queſta precioſa paſtura: perchioche non ſolamente é ſempre ſana à gli armenti; ma, eſſendo poſta in terreno conveniente a lei rende fruto talmente, ché ... (come dice anco Columella) un jugero Romano per l'ordinario debbe far le ſpeſe un anno à tre cavalli.——Queſta ſingular paſtura ſi ſegerà (fuor dal primo anno) cinque, ſei, & anco fin ſette volte ne gli altri ſeguenti.

Vinti Giornate dell' Agricoltura, 4to, 1550, p. 35.

X.

Castore Durante della *Medica.*

E comminciata (la *medica)* a ritrovarſi in Italia 1585[d]) dove ſi ſemina per il beſtiame. Ama luoghi humidi e netti, e ſeminaſi d'Aprile & di Maggio. Ingraſſa paſcendola il beſtiame: ma non e darla in troppa quantità, perchioche generando ſangue ſoverocchio ſtrangolo il beſtiame. Ad ingraſſare i cavalli non ſi ritrouva coſa migliore della *medica.*[e]

Herbario. Fogl. in Roma 1585, cum fig. lign. pulcherr. p. 279.

XI.

[d] In confirmation of this, *Matthioli* owns, in the year 1558, that he had never ſeen lucerne growing in *Italy*; and on that account there is no print of it in his Commentaries on *Dioſcorides.*

[e] I have been aſſured in *Italy*, by curious botaniſts well ſkilled in agriculture, that the lucerne or medica, then introduced into huſbandry at *Rome*, was not *that* ſpecies of medica whoſe culture is here recommended, but the *medica cochleata*, or *ſnail-*

XI.

BARNABY GOOGE.

Among all ſorts of fodder that is counted for the chiefeſt and beſt which the people of old time, and the *Italians* at preſent, call *medica*. No better food can be deviſed for cattle, wherewith they will better feed or ſooner riſe.

Whole Art of Huſbandry, 4to, *black letter*, 1578, p. 37, a. 37, b.

XII.

DODOENS.

This is alſo an excellent fodder for oxen and kine, and for the ſame purpoſe was uſed to be ſown by the antient *Romans* in old time.

Herbal. lib. iv. p. 360, fol. 1600.

XIII.

DE SERRES on *Lucerne*.

Pour engraiſſer le cheval maigre, pluſieurs moyens y a-il : mais de tous, les plus propres ſont ceux du printemps, par le vert qu' on fait manger aux chevaux ; & du vert, l'herbe de la *Luzerne* eſt la meilleure : laquelle freſchement coupée donnée au cheval, l'engraiſſe dans douze ou quinze jours : le purgeant, & faiſant vuider, les trois ou quatre premiers

ſnail lucerne, vulgarly called in our ſeed-ſhops *ſnai's*. What confirms me in this opinion is *Durante*'s own print of it : Now *Durante* knew the archbiſhop who introduced it, and was patronized by him.

It is not to be doubted but that *this* medica affords very agreeable food to graminivorous animals. I remember I had about twenty fine plants of it in a flower-garden, but an horſe broke in and devoured them all in a few minutes, tho' they ſtood in different beds. Indeed, it was an horſe that had been long accuſtomed to the taſte of the *other* lucerne.

miers jours ; ſi bien, que par apres, il s'en rend diſpoſt & gai.

Théatre d'Agricult. fol. dedié a Henri IV. 1600. p. 985.

XIV.

Surflet and Markham.

There is not any pulſe, or other feeding, which is more agreeable or more precious for feeding beaſts than *ſnail-clover*, [lucerne :] So that it may ſeem to ſpring out of the earth . . . as a more eſpecial favour from God, not only for nouriſhing and fattening herds of cattle, but alſo to ſerve as phyſic for beaſts that are ſick.

Country Farm. 3d edit. fol. 1616. p. 564.

XV.

Samuel Hartlib.

There is at Paris likewiſe another ſort of fodder which they call *la lucern*, which is not inferior, but rather preferred before ſainfoin. Every day produces ſome new things concerning it, not only in other countries but in our own.

Legacy, 1650, p. 4.

Some account of lucerne, extracted from letters to *Hartlib*, about the year 1650, and ſent to him from *France*.

This plant requires a rich ground, ſomewhat looſe and light . . . not over dry nor over moiſt, but in a middle ſtate between both, yet ſomewhat more inclining to moiſture than the contrary.

" Lucerne naturally doth not love dung . . . But, " where dung is made uſe of, it muſt be well rot- " ted, and uſed long before the ſowing-time . . . " The firſt ſhoots of the ſeedling plants cannot

" well

" will endure the cold; and therefore the ſeeds " muſt be ſown about the beginning or midſt of " *April*——One buſhel of lucerne ſeed [c] is to be " ſown on that ſpace of ground which would re- " quire ſix buſhels of wheat. It muſt be carefully " weeded, eſpecially in the beginning.——It is " good for all ſorts of cattle, and their young; but " eſpecially for horſes, which are purged thereby " and grow fat in eight or ten days time.——The " hay muſt be houſed;—it is much more feeding " than any other hay.

" Lucerne procures abundance of milk to cows. " ——You may ſave the ſeed after the ſecond " cutting, any year of its growth, except the *firſt* " only.——The hay will keep good two or three " years, and one acre is ſufficient to keep three " horſes all the year long. [d]—The hay is too rich " and nouriſhing to be given to cattle, except in " winter.——My friend, in *France*, has reaſon " to think that lucerne will proſper admirably well " in *England*."

1649, 1650.

XVI.

BLYTHE.

There is alſo *la lucerne*, another French graſs, which is excellent fodder, and is rather preferred before St. Foin, being now of great credit amongſt them [the French.] I can ſay little concerning it, only to provoke the ingenious both unto the ſearch, experimenting, and communicating to public view, not one man being ſufficient for the experimenting all diſcoveries that may be made here and elſewhere.

[c] This, in the manner of ſowing broad-caſt way, agrees in the main with all the antient French accounts that I have ſeen, and amounts to an allowance of about 40lbs. of ſeed to an acre.

[d] This calculation of antient and modern authors will be examined in the ſucceeding eſſay.

I am confident every age, nay, every day, will bring forth something or other worthy of our embracements.

English Improver improved, 3d edit. 4to. 1653, p. 188.

XVII.

Woolridge *on* Lucerne.

Lucerne is commended for an excellent fodder. . . . It is good for all kind of cattle, but agreeth best with horses. It feedeth much more than common hay; so that lean beasts are suddenly fat with it; and causeth abundance of milk in milch beasts.—By eating this grass in spring, horses are purged and made fat in ten days time.

System of Agriculture, fol. 1668, p. 28.

XVIII.

M. Du Hamel.

La Lucerne merite d'etre cultivée avec soin, non seulement à cause de la grande quantité des fourages que cette plante fournit, mais encore parce que sanfoyn est d'une qualité superieure à tout autre. C'est une suite inséparable de la nouvelle culture, de donner des productions plus parfaites; les plantes croissent dans une air qui circule autour d'elles avec liberte, cette circulation les maintient pures & saines, exemptes de toute attainte de moisissure; car ces plantes frappées de rayons du soleil, le grand mobile de toute vegetation, parviennent dans toutes leurs parties à une grande perfection, soit dans leur substance, soit dans leur saveur: les bestiaux mangent ce fourage avec avidité, & un sont mieux nourris que de tout autre.

Experiences sur la nouvelle Culture, tom. iv. p. 520.

On

On voit quel avantage il y a pour ceux qui ont des terres propres a produire de la lucerne, de pouvoir faire dans une même année trois & même juſqu' à ſix recoltas, d'un foyn excellent qui convient à toute ſorte d'eſpece de bétail, chevaux, boeufs, vaches, moutons, qui tous le mangent en verd & en ſec. Je puis aſſurer d'après mes propres experiences, que ce fourage encore verd & coupè avant la fleur, a rétabli de jeunes chevaux qui maigriſſoient, ſans qu' on peut en ſçavoir la cauſe ; & que les vaches, qüi en ſont nourries, donnent quantité d' excellent lait : le ſeul défaut de ce fourage, lorſqu' il eſt ſec, eſt d'être trop nouriſſant, & trop appetiſſant pour le bétail, qui s'en goufle au point d' étouffer. Je ſcais que trois de mes correſpondants ſont parvenus à ſupprimer l'avoine à leurs chevaux, en leur donnant de la lucerne hachée en place de la ration d'avoine. Il y a cependant des chevaux qui ne peuvent s'accoutumer à cette nourriture.

Le Même, *Elemens d' Agricult.* tom. ii. 133, 134.

XIX.

M. BERTRAND. *

Je ne doubte pas, que ſi notre œconomie rurale étoit plus ſagement adminiſtrée, nous ne puſſions à notre grand profit augmenter conſiderablement nos *fourrages*, en établiſſant des *lucernes*, &c. & en un mot diverſes ſortes de prés artificiels, qui, bien menagés, donneroient à nos bêtes d'attelages une nourriture ſucculente, qui leur tiendroit lieu d' avoine, que pluſieurs leur epargnent à leur grand domage.

* *Eſſai ſur l'Agriculture*, 1760, p. 132.

XX.

Auteur Anonyme.

Mais que dirons nous ſi les œconomes modernes nous aſſeurent que d'un arpent de luzerne bien cultivée on peut nourrir quatre juſqu' a cinque bouefs? ——Nous changerons avec plaiſer de proportion. Tout fois ce cera bien *(en Suiſſe)* le non plus ultra. Ce qu' il y a de certain, ce qu' on peut couper dans nôtre païs cette utile & grandde certain herbe de fourage regulierement quatre à cinque fois & en Italie, ſix ou ſept fois par an, ſuivant le temoignage d' Agoſtino Gallo, qui a ecrit an. 1550;[f] & Columelle dit, qu' un arpent de l'herbe medica peut nourrir trois chevaux. [g] Que la culture de cette plante eſt recommendable!

Diſſertation ſur l'Agriculture à Zurich, 1761.

EX-

[f] A new edition of this work (which was intitled *Le Vinte Giornate d'Agricultura*) was publiſhed at *Bergamo*, in quarto, 1757.

[g] This aſſertion is examined at large in the eleventh *ſection* of the preſent Essay.

EXPERIMENTS

ON

TRANSPLANTED LUCERNE.

Ipſa novas artes varia experientia rerum,
Et labor oſtendit miſeris, uſúſque magiſter
Tradidit agricolis.
COLUMELL. *de Cultu Hortor.* v. 338.

THIS Plant, ſuperior to every other ſort of vegetable food (either green or made into hay) that has hitherto been made uſe of for the ſupport of cattle, has been the known object of cultivation ever ſince *Darius* firſt diſcovered it in *Media*, during his *Perſian* expedition. By this means it paſſed afterwards into *Greece*, and thence to *Italy*, before the times of *Cato* and *Virgil*. Since which latter period, the curious in huſbandry have propagated it more or leſs in various parts of the globe, almoſt from one pole to the other. But, notwithſtanding the experience of ſenſible men, and the curioſity of ingenious ones, through ſo many ages, yet the method of cultivating it, by *tranſplantation*, was not diſcovered till very lately: And, upon this diſcovery, the following eſſay is grounded.

And, if in writing *this*, or the *former* ESSAY, I could be ſo happy as to *contribute* towards the *en-*

riching of only *one poor, honeſt, laborious huſbandman*, I ſhould think myſelf *over-repaid* for all my trouble. But, be that as it may, thus much is certain, that the author was obliged to anſwer ſo many inquiries, by way of letter, concerning the new method of cultivating lucerne, that he thought it beſt to impart to the public the little he knew on the ſubject once for all; ſince every anſwer to the queries propoſed (ſuppoſing ſuch anſwer to be drawn up in a ſatisfactory manner) could be little leſs than an abridgment of the preſent treatiſe. It is beneath no good ſubject, ſays *Cicero*, to beſtow a few leiſure hours for the ſake of enriching or adding to the comforts of his fellow-creatures: *Ut, ſi* occupati *profuimus aliquid civibus noſtris, proſimus etiam, ſi poſſumus*, otioſi [f]. And hence a wiſe king remarks in the Travels of *Gulliver*, that the man who can produce *ſix* ſtems of graſs, or as many ears of corn, inſtead of *five*, may be looked upon as no unuſeful member of the community to which he belongs.

Virgil ſeems proud in having been the firſt who introduced georgical poetry into *Italy* [g]. *Lucullus* expreſſed ſatisfaction in being the perſon who naturalized the cherry-trees of *Pontus* in the *Roman* ſoil; nor is the author of this little, imperfect eſſay diſpleaſed in the attempt he has made to extend the *new* culture of lucerne from the banks of the *Rhône* to the borders of the *Thames*. But great thanks are due to *Bellingham Boyle*, Eſq; who has brought lucerne to flouriſh happily in our ſiſter kingdom of *Ireland*.

I take

[f] *Tuſc. Quæſt.*

[g] ——— Sanctos auſus recludere fontes,
Aſcræumque cano Romana per oppida carmen.
Georg. II. v. 175.

I take it for granted, that moſt readers know that mankind has attempted to raiſe lucerne by *three* different ways. The *firſt* is by ſowing the ſeeds promiſcuouſly, or *broad-caſt faſhion*, *with* or *without* corn, in ſuch manner as clover is ſown.

And, if the huſbandman thinks fit to adopt either branch of this two-fold practice, there is no diſpute, (at leaſt in my opinion) which of the two appears moſt reaſonable, and conſequently ought ſooneſt to be preferred. I therefore pronounce in favour of the *latter*, as being the practice moſt agreeable to the nature of a cold climate like ours, where the ſoil abounds with weeds and foul graſs.

The *ſecond* method of ſowing lucerne is *drilling* the ſeeds in rows, and keeping the plants clean by hand-hoeings and horſe-hoeings.

This practice we are far from diſcountenancing, but rather commend it highly; eſpecially, if the cultivator be maſter of a *rich* ſoil, with proper depth.

But, upon the whole, (ſo far at leaſt as appears from our obſervations and experiments) we chuſe to recommend to the public a third method of cultivating lucerne; which is raiſing the plants in a nurſery, and pruning and tranſplanting them according to rules which ſhall hereafter be given.

I already know from experience, that *this* operation, at the firſt commencement of it, is the moſt troubleſome and expenſive way of going to work; but the crops will laſt longer, and prove more advantageous to the undertaker in the event.

With reſpect to the hiſtory of this valuable plant, ſince the time of *Virgil*, we ſhall obſerve as follows: There is no doubt, but that its culture continued upon a flouriſhing footing in *Italy*, till the irruptions of the *Goths* and *Vandals*, and then is was de-

ſtroyed, or, to ſpeak more properly, allowed to periſh by the neglect and ignorance of ſuch ſavage invaders [b]. But as *Spain* ſuffered much leſs from the inundation of theſe barbarians than *Italy* did; and as the *Moors* were all lovers of plants, and to a certain degree herbaliſts; the culture of lucerne was faintly kept alive there, like a *Veſtal* fire; and probably the ſort we now have is a deſcendant from *Columella*'s lucerne, who removed it from *Italy* and naturalized it in *Andaluſia*, where that excellent cultivator was the cauſe of preſerving the plant in queſtion more or leſs genuine for many ages; much in the ſame manner as the purity of the *Greek* language was kept alive *plus minus* for ſeveral centuries by the colony at *Marſeilles*. From *Spain* this *medica* returned to *Naples*, and thence to *Volterra* and *Scandiano*, being held in much eſteem everywhere, but particularly near cities where land is ſcarce and dear. One *Hercules Cuccho*, a nobleman, fond of huſbandry, firſt raiſed it with ſucceſs in the *Venetian* ſtate, on this its ſecond appearance, about the year 1550 [c]. Not long afterwards the archbiſhop of *Montigli* (who was alſo biſhop of *Viterbo*) carried a parcel of the ſeeds to *Rome*; ſo that the culture of lucerne ſoon ſpread with rapidity over good part of the eccleſiaſtical ſtate and all *Lombardy*. [d] In ſome few years a count, *Fabio*, taught the *French* to raiſe lucerne round *Paris*: Inſomuch that, in *Henry* IVth's time, it was as common (at leaſt in the ſouthern parts of *France*) as broad-clover is in our fields at preſent [e].

About

[b] *Le Vinte Giornate dell' Agricoltura* di M. Agoſtino Gallo 4°. in Venet. 1569. p. 35.

[c] *Ibid. Giornat.* II.

[d] *Herbario di Ceſtore* DURANTE. Fogl. in Roma 1585. p. 279.

[e] De Serres; *Theatre d' Agriculture*, dedie au Roi Henri IV. fol. 1660.

About the year 1578, this plant found its way into *Germany*, [a] and was cultivated in one of the loveliest parts of the whole empire, namely, the *Lower Palatinate*. At the ſame time the fame of it reached *England*, [b] where all people admired it, and ſome few had the courage to make eſſays towards cultivating it; but their attempts were languid, and, as I conclude, unſucceſsful, notwithſtanding they had the practice of the antients to guide them, in the books *de Rebus Ruſticis*. At length *Hartlib* attempted to excite the attention of the public afreſh, in the year 1650. He did as much, circumſtances conſidered, as a man of his great genius could do. But as there was no method of raiſing it at that time generally known, but the common practice uſed in cultivating clover, it of courſe miſcarried in our climate.

Thus much with relation to the hiſtory of lucerne, and the progreſs of its cultivation. As to its nature and qualities, I ſhall beg leave to tranſcribe a few lines from a MS. poem, where the author, deſcribing hay-making time in the province of *Andaluſia*, expreſſes himſelf as follows: (And here I ſhall only obſerve that *alfalſa* is the old Spaniſh name for lucerne.]

Th' impatient mower with an aſpect blythe,
Surveys the ſainfoin [c]-fields, and whets his ſcythe.
Ynoiſa, *Agnes*, *Beatrix* prepare
To turn th' *alfalſa* [d]-ſwarths with *anxious* care [e]:
(No

[a] Conradus HERESBACH *de Re Ruſtica*, 8°. Colon. 1573. [At that time the *Germans* called lucerne *welſcheholken*.]

[b] *Barnaby* GOOGE's *whole Art of Huſbandry*, 4°. Lond. 1578.

[c] The beſt ſpecies of ſainfoin, hitherto known, is in the province of *Spain* we are now ſpeaking of.

[d] *Alfalſa* (from the old *Arabian* word *alfalſafat*) and *ervaye*, are the *Spaniſh* names for *lucerne*.

[e] No plant muſt be turned ſo often, nor with ſo much care, if we propoſe making it into hay.

(No more for *Mooriſh* ſarabands they call,
Their caſtanets hang idle on the wall)
Alfalfa, whoſe luxuriant herbage feeds
The lab'ring ox, mild ſheep, and fiery ſteeds;
Which *ev'ry ſummer, ev'ry thirtieth morn,*
Is *ſix times re-produc'd*, and *ſix times ſhorn!*

Lucerne, rightly managed, is capable of ſupporting heat and drowth even near the equator, and perhaps under it. It may alſo be raiſed ſucceſsfully in any climate where men and cattle can bear the rains and cold with tolerable eaſe: That is to ſay, in all countries between the ſixtieth degrees, incluſively, of northern and ſouthern latitude. ——Indeed, there are ſome few ſmall ſpots of ground that may prove unfavourable to its growth, not only in every climate, but perhaps in every diſtrict or pariſh: For inſtance, where moraſſes are found, or lands incommoded by ſtagnating waters, weeping ſprings, *&c.* as alſo lands that are tainted with metallic or arſenical matter; but ſuch inconveniences are only local and caſual, and the exceptions ſhall be ſpecified in their proper place.

If you have variety of ground, make a well-conditioned deep ſoil your option (eſpecially if you propoſe to drill the lucerne: And, if there is a farther alternative of choice, let that ſoil be rather inclined to moiſture than over-dry; but wet lands (eſpecially if water ſtagnates in them) are always fatal to lucerne.

In raiſing lucerne, our maſter *Virgil* recommends a *rich putrid* ſoil preferably to all others:

——Te quoque, *medica, putres*
Accipiunt ſulci.——

Georg. I. v. 215.

Now

Now it is probable, that the *putris terra* of *Virgil*, and the *temperata* of *Varro*, [a] which we are adviſed to chuſe upon this occaſion, are what we call a *rich loamy earth*, [b] which contains a greater quantity of vegetable food than any other common ſoil. Its properties are to expand and crumble into ſmall bits when dug or ploughed, [c] and yield a pleaſing ſmell after rain: [d] poſſeſſing juſt that degree of coheſion between clay and ſand, which is fitteſt for the nouriſhment of vegetables: for it hinders not the lateral ſpreading or perpendicular penetration of roots, and yet is not ſo weak as to be unable to hold the roots

[a] *De Re Ruſtica* lib. i. c. 41.

As it is my intention to give ſome ſhort account of the antient writers on huſbandry, wherever I have occaſion to quote them, it may juſt ſuffice to obſerve, that VARRO died about 27 years after the birth of *Chriſt*, being the moſt learned *Roman* of the age he lived in. He publiſhed his treatiſe of agriculture in the eightieth year of his age, and inſcribed it to his wife *Fundania*. "*Si homo eſt bulla* (ſays he) *eo magis ſenex. Annus enim oĉtogeſſimus admonet me ut ſarcinas colligam, antequam proficiſcar e vita.*"

Virgil made *Varro* his chief maſter in agriculture; for, not contented to copy many of his precepts, he ſometimes adopts his words and phraſes, and that particularly in the culture of vines. [*P. Victor. Explic. in Varr.* &c. p. 29. a.]

PALLADIUS, under the article *de medica ſerenda*, agrees with *Virgil* and *Varro*, in the choice of ſoil for raiſing lucerne. This author *(Palladius)* writ about the times of *Antoninus Pius*: Somewhat more than 160 years after *Chriſt*. [DE RE RUST. lib. v. tit. 1.]

[b] Much of the ſame opinion were the old *French* writers on huſbandry, and *De Serres*, who dedicated his *Theatr. d' Agriculture* to *Henry* IV, expreſſes himſelf in the manner following: "*Pour ſemer la luzerne l'on choiſera quelque endroit de ſa meilleure terre, plus ſabloneuſe qu' argilleuſe, plus legere que peſante, plus platte que pendante ... es endroits ſoleiles ... en beau ſolage & plein; toutesfois vuidant les eaux, a ce qu'elles n'y croupiſſent.*" En fol. p. 271.

[c] ——— *Sin in ſua poſſe negabit*
Ire loca, & ſcrobibus ſuperabit terra repletis,
Spiſſus ager. ——— VIRG. *Georg.* II. v. 234.

[d] Ground of ſuch a temperament contains equal proportions of clay and ſand.

MARKHAM's *Farewell to Huſbandry*, 4to, 1631, p. 126.

roots firm, and conſequently ſuſtain and keep the plants upright.

The particles of this ſoil, when diſturbed by turning, ſeem to recede from one another: And the earth, when dug and expoſed to the influence of the atmoſphere, expands ſo far, that, without you preſs it, it will more than fill the hole from whence it was taken. Which proves it to contain a putrefactive fermentation in its compoſition; and ſo much the rather, as it is naturally impregnated with fat oleaginous matter: And that more from ſome inherent inteſtine fermentation and motion, than from conſiſting of ſpongy dilating particles. [f] It alſo (as we obſerved before) ſends forth a pleaſing ſmell after ſoft mild ſhowers; and the ſame may be remarked of it, when it is dug, or ploughed, even in dry weather. And this indication of a good ſoil was well known to the *Greek* writers on huſbandry. [g]

Nor muſt we here forget *Virgil*'s deſcription of well conditioned fruitful land:

Quæ tenuem exhalat nebulam, fumoſque volucres,
Et bibit humorem, et cum vult ex ſe ipſa remittit;
Quæque ſuo viridi ſemper ſe gramine veſtit,
Nec ſcabie & ſalſa lædit rubigine ferrum:——

Illa

[f] See Dr. Home's *Principles of Agricult. and Vegetat.* Part I. Sect. 3.

[g] Ἀπὸ τῆς μὲν ὀσφρήσεως τὴν καλλίω [γῆν] δοκιμάζειν.
GEOPON. Lib. ii. c. 10.

For the account of a good ſoil, as verified by practice, ſee *Reginald* SCOT's *perfect Plat-form of an Hop-garden*, 4°. 1576. c. 2. This gentleman writ about 40 years after *Fitz-Herbert*, and is, in point of time, the ſecond writer on *Engliſh* huſbandry, at leaſt, as far as my collection goes, in books of agriculture. He was a younger ſon of Sir *J. Scot*, in *Kent*; had received an univerſity education; and was looked upon to be a good ſcholar.

Illa ferax oleo eſt ; illam experiere colendo
Et facilem pecori, & patientem vomeris unci.
GEORG. ii. v. 217.

Which verſes being of a didactic nature, and, as it were, the very baſis of huſbandry, may be thus tranſlated almoſt verbatim :

Soils which exhale thin clouds and miſty ſtreams
Warm, half-tranſlucent ; drinking moiſture in ;
Diſcharging ſuperfluity at will ;
Cloath'd with perpetual verdure, all their own ;
And never found to mark the ſhining ſhare
With ſpeckled morphew and corroſive ſcars ;——
Such ſoils abound with oil. Juſt culture ſoon
Will wake the genial virtues of a land
Benign to cattle, patient of the plough.

Therefore, where people have much land and good choice of ſoil, we recommend the earth above deſcribed (or ſomething as like it as may be found) for the culture of lucerne.

And here it is hard to aſſign a reaſon, why the plant, now under conſideration, is called *lucerne*, ſince the canton of that name, in *Switzerland*, neither was, nor is particularly famous for producing this vegetable : Nor did the weſtern and northern nations of *Europe* receive it thence, as appears from the account given of its revival and progreſs.

Nay, M. *du Hamel* aſſerts, that this plant ſucceeds not at all in *Switzerland* ; though certainly it grows in various parts of the XIII Cantons extremely well, and all M. *de Chateauvieux*'s ſucceſsful experiments were made in the territory of *Geneva*, which may be looked upon, almoſt, as a part of *Switzerland*, in an huſbandry-ſenſe, as to air, climate, and vicinity, without entering into geographical niceties.

M. *du Hamel* alſo is pleaſed to ſay, *Que la lucerne vieut très mal en Anglettre*; though he muſt have read what *Tull* had then written concerning it. But, in this aſſertion, we flatter ourſelves he is miſtaken, except he alludes to lucerne ſown with ſpring-corn, in the manner clover is ſown.

It may now be time to proceed to the *experiment on tranſplanted lucerne* made in *England*; and, if the preſent Eſſay (or whatever elſe I may publiſh on the ſubject) has any degree of merit, it ariſes from this, that every practical and didactic part (except where references are made to other authors) is the reſult of my own experience; and, wherever I have no experience, the deficiency will be acknowledged.

Whoever propoſes to ſow a lucerne-nurſery, or engages in any larger undertaking of cultivating whole fields of ſainfoin, trefoil, buck-wheat, ſpurrey, fenugreek, ſweetmelilot, *&c.* would be noways ill-adviſed, if he prepared a bit of ground, and ſowed a ſpoonful of the ſeeds about a fortnight before he propoſed to ſow his larger quantity; ſince, from the good or bad ſucceſs of this little attempt, he may be enabled to judge, whether the ſeedſman has ſupplied him with ſeeds fit for vegetation.——Without ſuch precaution, a whole year may be loſt; which is a mortifying circumſtance in matters of huſbandry.

In the end of *March*, 1757, a common day-labourer was ordered to ſow a pound and a half of lucerne-ſeed, [b] and keep the ground clear from weeds.

The

[b] The ſeed was bought of *Wilſon* and *Sanders*, near *Durham-yard* in the *Strand*, and proved uncommonly good. Theſe perſons have ſupplied our friends and correſpondents ever ſince.

In hot countries, like *Spain*, *Italy*, *&c.* the huſbandman uſually ſows lucerne, and covers the ſeeds with a *traina* (a practice ſuperior to our buſh-harrowing) about an hour before ſunſet. Then the dews fall and moiſten the ground, whereas the ſeeds

The ſeed was ſown on one of the leaſt promiſing pieces of land in all the neighbourhood; but this was done by expreſs order; for it was thought unfair to make the experiment on a better ſoil than the commoneſt ſort of graſs-fields. The ſpot of earth, ſet apart for the purpoſes, both of nurſery and tranſplantation, was, in former times, a kitchen-garden: But the good ſoil, to the depth of 18 inches, had been removed for the ſake of manuring a corn-field. [To which we ſhall juſt add, that the attempt was made in an hilly country, where the *ſtaple* earth is naturally ſhallow.] What remained was a cold, yellow, clammy ſtratum, which the country-people looked upon as mere clay; but, its nature having ſince been better examined, it appears to be a mixture of imperfect clay, and imperfect marle.—No manure worth mentioning was uſed upon it, as will appear by the ſequel.

To all ſeeming appearance, little, or next to nothing, could be expected from a piece of ground of ſuch an unpromiſing caſt. But, upon the whole, the experiment proved ſucceſsful and eaſy.

By the middle of *Auguſt*, the plants were, ſome of them, 18 inches high; and many of them branched out, ſubdivided themſelves, and made very fine ſide-ſhoots. Upon which it was reſolved to venture upon the ſecond part of the experiment, according to the accounts given by M. *de Chateauvieux*,

ſeeds are ſhrivelled and parched in the heat of the day, inſomuch that they cannot expand themſelves but with difficulty.

See LIEBAULT, *Maiſon Ruſtique*, 4°. 1617, L. v. p. 527.

I thought proper to inſert this note, but apprehend it is of no great conſequence in our climate. Thus much, however, it ſeems to imply; namely, that it is never right (even in our country) to ſow lucerne during a great drowth, and eſpecially when the winds are dry and harſh.

vieux, [a] Therefore, taking the advantage of a moiſt ſeaſon, in the beginning of *September* (which ſeaſon, by the way, did not laſt long) we performed the work in the following manner:—[But here let it be juſt obſerved, in paſſing along, that the time of the year, pitched upon for tranſplanting, was, at leaſt, *three* weeks too late for *England*, though, perhaps, highly proper for the territory of *Geneva*, or the ſouthern parts of *France*. This therefore is ſet down as one of the *mutatis mutandis*, ſo indiſpenſably neceſſary in matters of agriculture, when the practice of one country is copied in another.]

Firſt the roots were dug up carefully: Orders being given before-hand not to attempt drawing them, even with the ſmalleſt degree of violence, till the earth was intirely looſened at top and at bottom. In the next place, the long tap-roots were cut off, 8, 9, or 10 inches diſcretionally below the crown of the plant: (The ſciſſars being generally applied juſt beneath the forks of the root, if it be a branching root) about the place marked by the undermoſt dotted lines in plate V.—Then the ſtalks were clipped about 5 inches above the crown of the plant: And the remaining plant, after theſe amputations (which may appear, at firſt ſight, to be very

[a] M. *Lullin de* CHATEAUVIEUX, chief ſyndic of *Geneva*, a gentleman of great worth and knowledge, and of a moſt communicative diſpoſition, hath amuſed himſelf with the ſtudy of agriculture many years, and advanced that art very much, not only by improvements, but ſeveral new inventions and diſcoveries: But, being called, of late, to diſcharge his civil office in the republic, has not been able to oblige us with a continued ſeries of his obſervations.

One may call this gentleman a true citizen of the world, who, like another *Metrophanes* according to the inſcription on an antient *Roman* marble) *has done good to all men, and harm to none.* He deſerves a place amongſt *Virgil*'s heroes of peace:

Inventas—qui vitam excoluêre per artes.

ry bold ones) was thrown into a large veſſel of water which ſtood by for that purpoſe, in the ſhade. Such refreſhment is no-ways unneceſſary; for this plant is very impatient of heat and ſunſhine after it is taken up; nay, to ſuch a degree (at leaſt the firſt half-year of its growth) that one may almoſt call it a ſenſitive plant.—The ſame day, making uſe of a dibble, or ſetting ſtick, and filling every hole with water before the roots were put in, we tranſplanted them in rows, 2 feet aſunder, and each plant 6 inches apart in the rows; having firſt made little drills, or channels, and ſprinkled or half filled them with ſea-ſand and wood-aſhes kept dry: (Two parts of the former to one of the latter;) which was done with a view of looſening the ſoil, and giving a little warmth to a piece of ground, which was naturally cold and clayey; nor was any other manure uſed. The drills were afterwards once watered, to take off the dryneſs and heat of the aſhes: [g] The roots were placed firmly in the ground, and two inches of the ſtalks covered with mold.

Yet here it muſt be freely acknowledged, that the hopes of poſſeſſing a large crop occaſioned *one* miſtake, which we chuſe rather to mention than ſuppreſs, as many people may happen to entertain the ſame falſe expectances. The *miſtake* was, that we made our rows two feet aſunder, which was over-narrow; and placed the plants, in the lines, only ſix inches apart, which brought them nearer together, than they ought to have ſtood, [h] even though the ground was very poor. Nor did we foreſee, that horſe-hoe ploughing is five times more efficacious, as well as cheaper than hand-hoeings.

Therefore after frequent experiments, ſince made, it appears beſt to make the lines *three feet*

[g] See the *Vinti Giornate dell' Agricoltura* di M. *Agoſtino* GALLO, p. 35.

[h] This acre contained about 26,000 roots.

four inches distant from each other: And, if the soil is good, it may not be amiss to allow each plant *a foot* distance one from another in the lines, for thus the hand-hoers will work more commodiously, and a little hoe-plough may be guided safely up and down the intervals, which will save a great deal of trouble. Nor will the future crops be lessened by such thin transplanting, half so much as may be imagined; but, on the contrary, the plants will be larger, more juicy, and better tasted; which circumstance may be extended in favour of the *new husbandry* in general. Space and culture improve the herbage and seeds of plants. In proof whereof, I have been assured, from good authority, that all the corn, raised by M. *de Chateauvieux*, sells at an advanced price; being larger, brighter, and healthier than common corn, and, consequently, more fit for sowing, or making bread.

But, by way of confirming the necessity of allowing lucerne-roots a good share of space, a friend of the author's filled an acre with plants, according to the *first* directions; but, the soil proving extremely good, and free from weeds, it soon appeared, that the roots stood too close. In consequence whereof, every other plant was taken up the next autumn, and, a fresh acre of land being properly prepared to receive them, he thus gained a new plantation of lucerne, at a small expence, with little trouble: And, what is more remarkable, it is thought the *second* acre bore a larger quantity of herbage than the *first* would have done, if the plants had continued as they were, without being thinned, to the amount of one half. [c]—Of course, there is reason to conclude, that this slight hint, which took its rise from mere accident, ought not to be looked

[c] I have lately been informed, that M. *Eyma* was once forced, by the same necessity, to take up every other row in the year 1757.

looked upon as quite unuſeful, ſince two acres may be raiſed with almoſt the ſame expence as a ſingle acre.

An anonymous theoriſt, in matters of huſbandry, ſays, "that an acre of lucerne, planted in ſingle rows, each plant 6 inches aſunder, will produce 29,040 plants, which yielding a pound of hay each, the hay off one acre will amount to 14 loads, of 1800 lbs. weight each."

We acknowledge, that an acre, thus managed, will produce, very nearly, the number of plants above ſpecified; but, except the ground be of an uncommonly good caſt, how will the roots be enabled to expand and procure ſufficient nouriſhment?[1] For it is certain, that the *weeds* which naturally riſe in a piece of cultured land, where the hoe-plough (by reaſon the lucerne-plants ſtand ſo cloſe) cannot be admitted, will defraud their neighbours, that is to ſay, the lucerne-plants, of their needful quantity of ſuſtenance: And, of courſe, hinder *their* roots from expanding themſelves in order to procure food.

Beſides, when two plants, one, for example, a *weed*, and one *lucerne*, ſtand ſo cloſe to each other, the branches of the weed will over-ſhade, and drip upon the branches of the lucerne. Nor does any plant like the effluvia waſhed off from another plant.

As to the remark of the anonymous author, I am more inclined to think, that, in a field of lucerne, with narrow intervals, and plants ſtanding at 6 inches diſtance one from another in the rows, each plant (one with the other) may, in all probability,

[1] In a deep ſoil, the roots of drilled lucerne, *untranſplanted*, may ſtand nearer than the roots of lucerne *tranſplanted*; as the *former* make not ſuch large lateral ſhoots, and procure ſuſtenance at a greater depth. This I obſerved, laſt year, in a patch of lucerne, raiſed at *Wincheſter*, in very rich ground.

bility, afford only 3 ounces of hay each, inſtead of a pound.

But the ſelf-ſame ground will certainly produce a greater burthen, if every other plant be removed the ſecond year, and placed at a diſtance of one foot from each other in the rows, with intervals for horſe-hoeing, or digging, *&c.* of 3 feet 4 inches breadth.

What the ſame author reports afterwards comes nearer the truth:

"If, by the introduction of ſuch crops, land can be thus improved in its returns to the huſbandman, it becomes a great national acquiſition: For, if one acre of lucerne can maintain 3 or 4 horſes a year, [b] inſtead of one horſe's conſuming the produce of 3 acres in a year (of common graſs) as in the uſual way, this is equivalent to increaſing the quantity of land in this kingdom, 12 or 18 times." (I ſhould rather think 3 or 4 times:) "Which is a greater national advantage, than the addition of a proportionably larger extent of country."

But to return to my firſt experiment.

In ten days, though a drowth ſucceeded, ſome tranſplanted plants made ſhoots of three inches height, which vigorous growth gave better hopes than had been conceived at firſt.

It was alſo ſome encouragement to the undertaker, that he found *wild* lucerne, [c] within two muſquet-ſhots

[b] The author, here cited, has added a *fourth* horſe; *Columella* and *Palladius* ſay, only *three*. Had they named but *two*, I ſhould have been better ſatisfied. However, this traditional truth, or miſtake, ſhall be examined more at large in the XIth SECTION. If the account be true, the *Roman* huſbandman's horſes muſt not be ſuppoſed to equal our fine large cart-horſes in ſize, or appetite. They were rather what the preſent *Italians* call *cavaluccii*. Nor did the antient *Romans* perform the drudgery of huſbandry-work with horſes, but with oxen.

[c] This was the ſpecies of lucerne called *medica paluſtris*, or *meadow-lucerne*. *St. Liger* and other huſbandry-writers ſuppoſe (errone-

ſhots of the place where the nurſery was formed. Theſe plants were certainly *aborigines*: For they grew in a part of the kingdom where the name of lucerne had rarely been heard of, except by gentlemen. Beſides, no perſon curious in huſbandry would have ventured ſowing the ſeeds in ſuch an unpromiſing piece of ground; for the field, where the wild lucerne grew, was a ſort of coarſe, uncultivated moraſs, and valued only at about two ſhillings and ſix-pence an acre.

Yet ſtill the approach of winter made many peoſons doubtful concerning the ſucceſs of this new plantation; nevertheleſs, it was ſome ſatisfaction to recollect, that there is leſs harſh, ſevere cold in *England* (and that almoſt by one third) than in the territory of *Geneva*, where the original experiment was made, and where the plant we are ſpeaking of has been known to thrive ſo extremely well.

At length the winter paſſed over, and, out of four thouſand roots, only thirty or forty periſhed, whether by froſts, immoderate rains, or any other accident, is hard to ſay: But the labourer filled up all the vacant ſpaces from the nurſery in about an hour, and in *April*, 1758, moſt of the plants were nearly equal in ſize and ſtrength; of a deep juicy verdure, with few or no diſcoloured ſickly leaves. By *May* the 8th, people counted ſixty ſtems from one particular root, and the ſtalks and leaves of ſome choſen plants weighed near half a pound at one cutting. Yet we learn, by experience, that lucerne muſt only be conſidered, as in a progreſſive ſtate, till the *third* ſummer after tranſplanting, and then M *du Hamel* aſſures us, that one flouriſhing plant will produce *a pound* of well dried hay; which is ſaying, a great deal, and much more than I

(erroneouſly, as I imagine) that the red honey ſuckle, perennial clover, in dry, ſweet, upland paſturages, is a wild degenerated lucerne.

could ever verify; for, if a ſingle plant produces *one pound of hay*, it muſt have weighed *four pounds*, when it was *green*. Yet I have received an account from an eminent phyſician in our own country (who planted 2 acres of lucerne by my directions) that many of his plants, in the ſecond year, yielded near half a pound of hay each plant.

As an acre of lucerne, thus managed, will contain more roots than one is apt to imagine at firſt gueſs, how great muſt the produce be of four or five cuttings every year, and thoſe confeſſedly the moſt nouriſhing and palatable food that cattle can eat? [n] For thus much is certain, amongſt other advantages, that, if a field be induſtriouſly hoed, ploughed in the intervals or ſpaces, and hand-weeded in the rows, for the firſt two or three years, it is almoſt ſure, that horſes, cows, or ſheep, will hardly find a ſingle weed in a large quantity of green food.

We will now mention the ſtate of our tranſplanted lucerne in its ſecond year, namely, 1758.

And

[n] See GOOGE's *Four Books of Huſbandry*, 4°, 1578, *Saxon* letter, and imprinted for *John Wright*. This valuable writer, *Barnaby Googe*, Eſq; tranſlated the work here ſpoken of, from the *Latin* of *Conrad* HERESBACH, a *German* nobleman, who publiſhed it at *Cologn*, in 1573. *Googe* alſo has tranſlated ſomething from *Palingenius*, perhaps the *Zodiacus Vitæ*; but I never ſaw it, to the beſt of my remembrance.—This gentleman (our ſecond author of note in matters of huſbandry, writ forty years after *Fitz-Herbert*.——He was of *Albingham*, or *Alvingham*, in *Lincolnſhire*, and grandfather to *Barnaby Googe*, Eſq; who lived there in 1634, and after. The Epiſtle to the book of Huſbandry is dated at *Kingſton*, *February* 1, 1577. *Gervaſe* MARKHAM reprinted this work in 1614, 4°, with *inſertions*; intended chiefly to adapt *German* huſbandry to the *Engliſh* climate. [*Markham*, by the way, appears to be the firſt *Engliſh* writer who deſerves to be called a *hackney-writer*. All ſubjects ſeem to have been alike eaſy to him: Yet, as his thefts were innumerable, he has now and then ſtolen ſome *very good things*, and, in great meaſure, preſerved their memory from periſhing.]

And here let it be remembered, that what cultivators call a proper time for cutting, is, when the plants are about 15 or 16 inches high, at an average, throughout the field: But this muſt be underſtood in a relative ſenſe, for ſome plants will be 2 or 3 feet high, and others may not be above 10 inches, or 1 foot in height, according to the circumſtances of health, ſpace, ſituation, *&c.* of the ſeveral roots.

The cuttings of the year 1758 were as follow: *May* 8th, *June* 7th, *July* 12th, *Auguſt* 20th, and *October* 1ſt.

In the year 1759, it was cut 5 times, and 6 times [c] in 1760; which made 16 cuttings in 3 years. Nay, by the 9th of *April*, in 1760, ſome of the lucerne plants were near 17 inches high, at a time when no field in the neighbourhood had graſs of 4 inches height, though you took 5 or 6 acres together. The ſame lucerne was cut twice, before any hay-making began in the country round it: If we except ſome few meadows lying near market-towns.

Having carried on my firſt experiment thus far, upon almoſt as unpromiſing a piece of land as could be found, and being ſenſible I had made ſome miſtakes from want of experience (having as yet never ſeen any tranſplanted lucerne in *England*) I gave directions for making a ſmall plantation in *Berkſhire*, but ſtill took care to chuſe a field that could hardly be called middling land. It was over-run with coarſe weeds, had been long out of tillage, and the earth, in moſt places, was hardly 4 inches above a bed of chalk; *which* (let farmers ſay what they pleaſe of it in reſpect to ſainfoin [d]) is no ways favourable

[c] The *ſixth* cutting, if it be after the firſt week in *October*, is little more than nominal.

[d] We have obſerved, elſewhere, that lucerne and ſainfoin require the ſame ſoil and the ſame culture; no two plants being more alike in every reſpect.

vourable to the growth of lucerne: Eſpecially if the latter be *tranſplanted.* For the clalk ſlakes, when thaws and rains come on; and it either heaves the plants out of the ground, or expoſes the fibres of the roots too much to the cold. Yet upon this I ventured with my eyes open; for *Pliny* ° whoſe authority I ſcruple not to take, when I have no other) had given me a caution concerning lucerne raiſed upon chalky lands; but what induced me to make the attempt was, that the goodneſs of the ſoil might not lead me to ſay more concerning the ſucceſs of an experiment, than other people may hope to find. More will be ſaid of this plantation in SECT. X.

As I think it unfair to ſuppreſs any unſucceſsful circumſtances in matters of huſbandry, I will here ingenuouſly confeſs, that the moſt material of my firſt miſtakes were theſe:—I followed my foreign inſtructions (which, at that time, were but few) with too much diffidence, and in too literal a manner.—I was not enabled, through want of experience, to adapt the huſbandry-practices of other nations to the *Engliſh* climate.——I tranſplanted too late; filled my rows too full; and allowed not ſufficient ſpace for the intervals.——By following the *French* directions over-cloſely, I cut the tap-roots too ſhort in the beſt plants; and knew not (as it is a point unmentioned by any cultivator of lucerne) how to manage a root that was very ſmall.—The means of avoiding and rectifying all which miſtakes and difficulties are, by the help of ſubſequent experience, carefully pointed out to the cultivator in various parts of this Eſſay.

And here it may be worth conſidering how to apply a field of lucerne, carefully and induſtriouſly cultivated, to the greateſt advantage.—In ſuch a caſe, let us ſuppoſe the plantation to conſiſt of two acres,

° *Hiſt. Natural.*

acres, and that four large horſes are to be ſupplied with green fodder, from the end of *April* till *Michaelmas*. Now, in order to manage this affair with dexterity, count the number of rows or lines in the lucerne-field, and place in one of the headlands 30 land-marks, at equal diſtances; and thus, having cut a proper portion, day by day, you will be ready to begin afreſh, after the laſt cutting; fulfilling the remark of *Virgil*:

———*Redit labor actus in orbem:*
Atque in ſe ſua per veſtigia volvitur annus.

When I ſay *you will be ready to begin afreſh, at the end of* 30 *days*, I muſt deſire to be underſtood, with a ſmall degree of latitude: For *phyſical* accidents are ſo numerous and unavoidable in regard to the growth of plants (though lucerne is liable to fewer checks and miſcarriages, than moſt other cultivated field-vegetables) yet ſtill the nature of the thing will not allow us to predict the time of each and every periodical cutting with much certainty;—nevertheleſs, thus much may be depended upon, even for ſome years ſucceſſively, that, after the firſt annual cutting, our directions, here given, will be attended with no inconvenience to the owner; for there will rarely be more than three or four days difference between the times of the *ſecond*, *third*, and *fourth* cuttings.—Nor will the want of lucerne-fodder, during ſuch ſhort intervals, be of the leaſt ill conſequence; for, ſurely, that huſbandman muſt be a very improvident manager who has not other graſs-fields by way of a momentary ſupply.

The times, therefore, of the *ſecond*, *third*, and *fourth* annual cuttings, are tolerably certain; but the *firſt* cutting, according to the nature of the winter, may be accelerated, or retarded, a fortnight, three weeks, and, perhaps, a month.

The

The time of the *fifth* cutting, is alſo, in ſome degree, variable and uncertain, as the ſolar heat decreaſes, and the days grow ſhorter. A *ſixth* cutting, which is ſeldom of much conſequence, chiefly depends on a fortunate ſeaſon, in conjunction with the induſtrious good management of the cultivator.

From this ſucceſſion of freſh green food appears one ſingular advantage in raiſing lucerne: And, in the next place, care muſt be taken, that your plantation be always proportionable to your number of cattle; or, in other words, let it be a rule to you to have rather over-much lucerne, than too little. For then one cutting may be ſet apart for hay, which may be given occaſionally to favourite horſes and ſick cattle. But, in caſe no hay is made, the owner of the ground, even then, by means of the ſupplies he derives from green lucerne, will be enabled to ſpare a large quantity of other graſs for hay-making; and thus two acres of lucerne will give him the power of ſaving two or three tuns of hay more than he could have ſaved otherwiſe; conſequently lucerne, *in effect*, helps to keep cattle both in winter and ſummer.

By ſuch ſort of huſbandry, and provident management, the ſtock of hay for winter will be conſiderably increaſed, and the owner enabled, for the ſpace of five months at leaſt in the other parts of the year, to allow his horſes very nearly the ſame quantities of green food each day; all equally freſh, wholeſome, and well-taſted. Which ſingle circumſtance (if it related to horſes only) gives lucerne the preference over all other ſorts of green fodder hitherto known; and in proceſs of time may be applied (as has been experienced with much ſucceſs) to the fatting of horned cattle, provided ſuch cautions are uſed as ſhall be ſpecified hereafter, and which ought always to be remembered.—Now

what-

whatever increaſes the number of cattle, augments the quantity of dung neceſſary for carrying on the more ſucceſsful cultivation of arable lands; and *whatever*, by multiplying the number of cattle, affords more animal food to man, will of courſe contribute towards leſſening the price of meat, which will aſſiſt ſociety in general, and more particularly the manufacturer and peaſant.—For the grand ſecret of well-managing a trading populous country is to ſupply the inhabitants with fleſh and corn upon eaſy terms; for then mankind will multiply of courſe (ſuppoſing the government to be mild and equal;) nor will other nations underſell us, in the commodities we export to foreign markets.

Now lucerne, in matters of huſbandry, comes the neareſt, of any article yet known, towards attaining the points here propoſed; foraſmuch as one acre of land, thus cultivated, will ſupport as many cattle in ſpring, ſummer, and a part of autumn, as four acres of common, natural, [b] upland-graſs did before. But this uſe of lucerne is ſtill greater, if land be ſcarce; or if the nation be populous, and the ſoil has been cultivated, to the extent of the *old* huſbandry: For then the introducing this plant is, in effect, the ſame as creating new land, if the ſuperior

[b] It is with ſome unwillingneſs we uſe the diſtinction of *natural* and *artificial* graſſes (they being all equally natural, and the bounteous gift of God;) but the common language of every huſbandman makes ſuch diſtinction neceſſary, and of courſe we uſe it, in order to render our meaning intelligible to the generality of readers.—*Natural* graſſes, therefore, are ſuch as grow wild, and cover the ſurface of the earth without the aſſiſtance of culture, or are raiſed and managed in fields in a compendious negligent manner, which ſcarcely deſerves the name of culture: but *artificial* graſſes (if *graſſes* be a proper word on this occaſion) like lucerne, ſainfoin, ſpurry, ſweet melilot, &c. are to be introduced into the field with great care, and cultivated afterwards with equal diligence.——Many people have thought that a better diſtinction might be made uſe of: As, for example, *natural* graſſes and *improved* or *cultured* graſſes.

perior produce of lucerne, both in quantity and quality, be fairly conſidered by us.

Yet one thing muſt be well underſtood in the new practice of raiſing lucerne. Negligent huſbandmen, and ſuch as expect good crops without labour, expence, frequent plowings, weedings, *&c.* would act a *wiſe* part in not attempting to cultivate the plant here mentioned. Nor is it adviſable for gentlemen of fortune to commit this part of huſbandry to bailiffs and ſervants: Who (be their maſter's advantage ever ſo great) will not like the labour (tho' they are well paid for it) of turning fields into a ſort of gardens: And, beſides all this, may conceive a prejudice againſt improvements, and take ſome ſmall delight to ſee them miſcarry. So that all random, careleſs, and inſincere methods of culture muſt have nothing to do with raiſing plants, which, tho' hardy and long-lived after they attain a certain age, yet are ſurprizingly delicate and tender when they are young, or when firſt tranſplanted; and more eſpecially if wild couch-graſs and other weeds ſhould ſpring up amongſt them.

For theſe reaſons, at firſt ſetting out, I muſt adviſe every good cultivator to be particularly induſtrious in the extirpation of weeds; and that he over-burdens not the ſtrength of the earth from a principle of avarice, but allows her the juſt refreſhments of manures, and give her at leaſt ſome breathing-ſpace of eaſe and repoſe; remembering always the remarkable words which *Arethuſa* is reported to have ſaid on a like occaſion:

Neve tibi fidæ violens iraſcere terræ;—
Terra nihil meruit: patuitque invita rapinæ.
OVID. *Met.* lib. vi.

Which

Which puts me in mind of an expreſſion to the ſame purpoſe in an ingenious writer: [a] "No one "knows (ſays he) to this hour, how far our com- "mon mother may make kind returns to her in- "duſtrious and not unreaſonable children."

The antients were not only aſſiduous in deſtroying weeds, manuring the ſoil, and allowing it a competent degree of repoſe, but were alſo at the ſame time thoroughly ſenſible of the great inconveniencies which aroſe from the *maſter's inexperience* or *abſence*. *Cato* ſays, "That any eſtate may be looked upon as unfortunately circumſtanced, if the maſter takes leſſons in huſbandry from the bailiff." [b] *Florentin* obſerves, that, "if the bailiff learns any new practice in huſbandry, he ſhould always conſult the maſter, except the neceſſity be ſo preſſing, that he has not time to receive inſtructions." [c] And, again, an anonymous author in the ſame collection obſerves, "That the perpetual preſence of the maſter greatly improves an eſtate. It is he that makes every workman apply himſelf diligently in his reſpective department. It is he that takes notice of every deficiency, and points out the

[a] De marquis de MIREBEAU.

[b] The original paſſage is more ſtrongly worded: *Agrum peſſime mulctari cujus dominus non docet ſed audit villicum.* [This author, *M. P. Cato*, the cenſor, flouriſhed about 149 years before the birth of *Chriſt*, and was one of the firſt *Roman* writers who writ well in *Latin*. He learnt *Greek* of *Ennius*, and inſcribes his book to his ſon. He writes like a plain country-gentleman, whilſt *Varro* has more of the air of a *French* academician.]

Pliny lays a great ſtreſs on the maſter's preſence. *Frons domini plus prodeſt quam occipitium. Nat. Hiſt.* lib. xviii. c. 5. And *Xenophon*, ſpeaking of the confuſion which naturally ariſes where a maſter is not intelligent in rural œconomics, illuſtrates his meaning in the following manner: I can compare ſuch conduct, ſays he, to nothing more aptly, than if an huſbandman ſhould throw wheat, barley, peaſe, *&c.* into a mixt heap, and, when he had occaſion to uſe any one ſort of them muſt be obliged to pick them out grain by grain.' *In Oeconom.*

[c] In GEOPON. *de Villico*, lib. ii. c. 44, 45. FLORENTIN lived under *Macrinus*, about the year 218.

the means whereby to ſupply it: Commending thoſe that are active and dextrous, and reproving thoſe that are lazy and untoward. Thus directing his eyes to a ſingle point of view, he combines all the powers of his work-people in one univerſal act of diligence and induſtry. [d]

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[d] In *Geopon. de Villico*, lib. ii. c. 1.

As we have frequently cited this and other *Geoponic* writers, it may be worth obſerving once for all, that ſome ſuppoſe the collection of agriculture, called GEOPONICS, to have been extracted from the originals by one *Caſſianus Baſſus*: Others imagine the extracts to have been marked in the reſpective MSS. by the hand of *Conſtantine* IV, or ſelected by his orders, and then recommended to the public, under the patronage of ſo illuſtrious a name, by the *Greek* editor. *Cornaro*, who tranſlated this work into *Latin*, about 1528, 14 years before the *Italian* tranſlations were publiſhed, declares himſelf to be of the latter opinion, and ſo do the two *Italian* tranſlators, *Nicoli Vitelli* and *Pietro Lauro*. Nor are reaſons wanting for encouraging ſuch a conjecture, ſince, in a ſort of epiſtle dedicatory, prefixed to the original, by an anonymous author cotemporary with CONSTANTINE, it looks as if the emperor made the *excerpta*, and commanded them to be publiſhed: For the editor calls the *Geoponics Conſtantine's Commentaries*, and obſerves, that this prince, in ſeveral reſpects, was ſuperior to him, whom the world ſurnamed the *Great*.

Indeed, it muſt be acknowledged, that *Conſtantine* IV. had uncommon merit; for, having conquered the *Saracens* and *Arabians*, and performed great exploits by ſea and land, he not only patroniſed the arts of peace, but ſtudied the practices of them diligently, fixing his chief attention on *the advancement of huſbandry*. He alſo reſtored philoſophy and eloquence, and collected the deciſions of the famous ſynod held at *Conſtantinople*.

The extracts relating to agriculture, preſerved by him, are ſelected, principally, from *Greek* writers; nevertheleſs, ſome detached parts are tranſlated from *Latin* authors: and much are we obliged to this imperial care; for the *Greek* MSS. from whence theſe extracts were made, are now loſt; as are many others which were written in *Latin*.

Of courſe, the *Geoponics* ſerve as the beſt commentaries towards explaining ſeveral diſturbed and corrupted paſſages in ſuch *Latin* writers, *de Re Ruſtica*, as now remain; and the ſaid *Roman* authors, in their turn, where they copied or tranſlated

from

Two modern authors agree preciſely with the antients in this particular; and the remarks they have made upon the occaſion may be ſeen and examined at the bottom of the page. [e]

To theſe obſervations may be added the common *Engliſh* proverb, which is as follows: *The beſt dung in the world is the maſter's foot.*—Nor ought ſuch ſort of ſayings to be looked upon as mean, trivial, and vulgar; for my Lord *Bacon* (if I miſtake not) ſomewhere ſays, that country proverbs "are good ſenſe ready cut and dried." Nay the proverb here introduced, is as old as the times of *Plutarch*, and even the elder *Pliny*, who both mention a common ſaying to the ſame purpoſe. The *Rabbins* have alſo a proverb in favour of induſtry, which deſerves to be repeated, "When the tale of bricks is *doubled*, then comes *Moſes*."

What has been here ſaid may perhaps appear ſufficient to convince any gentleman, that he can never hope for ſucceſs in cultivating lucerne, except he be preſent at the preparation of the ground, as alſo at the times of ſowing and tranſplanting; and ſees every thing executed according to his own ideas and directions. Nor does the work end here. He muſt be eye-witneſs of the ſubſequent hand-hoeings,

from the *Greek*, are excellent expoſitors of various puzzling and dark paſſages in the *Geoponics*:

——— *Alterius* ſic
Altera poſcit opem res, & conjurat *amice*.

[e] "On ne doit gueres attendre une telle attention d'un fermier: il faut que le maitre s'occupe lui-meme de cette culture, ſans quoi point de ſuccés." DU HAMEL, *Cult. des Terres*, tom. ii. p. 344.

"Le maître eſt toujours prêt à quitter la compagne pour aller s'etablir à la ville: En ſorte que dans la plupart de nos terres, il ne reſtent que des mains, & point de tête." *Eſſai de* M. BERTRAND, *à* Zurich, 1760, 8°. p. 123.

Varro has expreſſed this thought extremely well: *Omnes enim patres-familiæ, falce & aratro relictis intra murum correpſimus, & in circis potius ac theatris, quam in ſegetibus ac vinetis manus movemus.* Varro *ut citat. d* Columell.

hoeings, weedings, and horſe-hoeings, the application of manures, and in ſhort all that relates to diligent and accurate huſbandry.

The difference is amazingly great between ground that is well or ill cultivated: Half-manured, or almoſt totally abandoned to wild chance. [f] Amongſt the *Romans*, the occupier of a field ill cultivated was liable to receive ſome public cenſure from the magiſtrate. [g] And from the ſame authority we are told in another place, that a tract of land whoſe culture is neglected, becomes more hurtful to ſociety than a barren one. [h] Nay, remiſſneſs in general, and neglect in the article of deſtroying weeds, will be found to injure the land, as much as *Ceres*, the goddeſs of fertility and plenty, is reported to have hurt it, when, in her tranſports of anger againſt mankind, ſhe withdrew her kind maternal influence from the earth; which an antient poet has thus deſcribed with his uſual elegance:

—*Arvaque*

[f] "God gave the earth in common to all men, but, ſince he gave it for their benefit, and the greateſt conveniencies of life they were capable to draw from it, it cannot be ſuppoſed he meant it ſhould always remain common and uncultivated. He gave it to the uſe of the *induſtrious* and rational; and *labour* was to be *his title* to it." LOCKE *on Government*, p. 167.

"*Labour* puts the difference of value upon every thing.—The property of labour overbalances the community of land.—Conſider what is the difference between an incloſed well-cultivated acre, and an acre of the ſame land lying in common without any huſbandry upon it, and you will find that the improvement of labour makes the far greater part of the value. I think it will be but a very modeſt computation to ſay, that, of the *products* of the earth uſeful to the life of man, moſt of them are the effects of labour. Nay, if we will rightly eſtimate things as they come to our uſe, and caſt up the ſeveral expences about them, what in them is purely owing to *nature*, and what to *labour*, we ſhall find that, in moſt of them, $\frac{99}{100}$ are wholly to be put to the account of labour." *Ibid.* 170.

[g] Agrum male colere *cenſorium* probrum judicabatur. PLIN. *Hiſt. Nat.* Lib. xviii. c. 3.

[h] Nihil eſt damnoſius deſerto agro *Idem, ibid.* c. 5.

——————*Arvaque jussit*
Fallere depositum, vitiataque semina fecit.
Fertilitas terræ latum vulgata per orbem
Cassa jacet, primis segetes moriuntur in herbis,
Et modo sol nimius, nimius modo corripit imber,
Sideraque ventique nocent, avidæque volucres
Semina jacta legunt: Lolium tribulique [d] *fatigant*
Triticeas messes, & INEXPUGNABILE *gramen.*
OVID *Met.* Lib. 5. v. 479.

She bade the lands be faithless to their trust,
And breath'd a curse on ev'ry useful grain:
Earth's boasted fruitfulness declin'd and fled:
The corn expir'd in life's first milky bloom,
Now scorch'd by *Phœbus*, now by *Auster*
drown'd;—
O'erturn'd with hurricanes, by birds devour'd,
Or smote with astral influence; whilst uprose
The pirate-dock, that 'midst confusion thrives:
The miscreant-cockle sucking tainted juice,

R Sick

[d] We have taken the liberty to substitute the dock in room of the *tribulus*, in our translation.

I have often observed, in *Italy*, this pestilent weed, so destructive to the husbandman's crops, and so much complained of by *Virgil* and others. There are two kinds of it, the land and the water-*tribolo*; but care must be taken not to confound the *tribolo terrestre* with a plant of very different nature and qualities, called by the *Tuscans tribolo*, or more properly *trifoglio cavallino* (which is its other name.) This plant affords delicious food to horses, and is of so grateful a smell that the *Florentines* distill a perfumed water from it.

The land-*tribolo* of *Virgil* produces a purslain-leaf, but more thin and delicate than the leaves of real purslain. When its little tendrils disappear, new leaves put forth. Sharp hard prickles succeed, which, when bruised, have an acrid, bitter taste. The seeds bruised have powerful qualities, and an infusion of them in wine is reported to break or dissolve the stone in the kidneys.

It is remarkable that, when the septuagint translators render the names of the plant denounced by God as the criterion of human industry, as well as a punishment after the fall, the words they make use of are, ἀκάνθας καὶ τριβόλους.

Sick nature's wayward child;) and graſs *canine*,* Rebellious, unſubdu'd by ſtrength or art.

Thus much in general with regard to the neceſſity of extirpating weeds; but lucerne, in particular, being a long-lived plant, arriving at moſt to its full ſize and growth three or four times a year, and ſometimes oftener, and demanding, of courſe, much nouriſhment, diſlikes the neighbourhood of all other vegetables that defraud it of due ſuſtenance, or in ſhort that quantity of ſuſtenance which its nature requires.

Induſtry, therefore, may be juſtly called the ground-work of agriculture; and, again, it is amazing what the ſpirit of improvement may do, when conducted by knowledge. In proof of which, the following ſhort anecdote may not be looked upon as uninſtructive.

The famous *la Quintinie*, director of the royal gardens in *France*, obtained from *Lewis* XIV. an abbacy for his ſon in one of the remote provinces: and going ſoon afterwards to make the abbot a viſit (who was not then ſettled in his apartments) he was entertained and lodged by a neighbouring gentleman with great friendlineſs and hoſpitality. *La Quintinie*, as was natural, ſoon examined the gardens of his hoſt; he found the ſituation beautiful, and the ſoil excellent; but every thing was rude,

* *Graſs canine*; *dog's graſs* or *couch-graſs*. Every joint of a fibre in the roots of this plant will grow; and therefore the poet, with great propriety, gives it the epithet *inexpugnabile*. I have expoſed one bit of a root to the open air, during a ſevere winter; and it has grown in ſpring with much ſtrength, when placed in the ground: Nay, a ſmall joint, tranſplanted, has filled a ſuperficial yard-ſquare of land in twelve months. In ſhort, it is the laſt weed one would undertake to extirpate with any hopes of ſucceſs.

Upon the whole, I can compare couch-graſs with but one weed in the world, and that is the *mal-nommée* of *Hiſpaniola*, which diſperſes itſelf over a whole field by means of its winged ſeeds, and, if not deſtroyed in due ſeaſon, over-powers and ſtarves the fineſt crops of indigo that can be raiſed. *Voyages de Charlevoix*, tom. ii. c. ult.

rude, ſavage and neglected. Nature had done much, and art nothing. The gueſt, delighted with his friendly reception, took leave with regret: And ſome months after ſent one of the king's gardeners to the gentleman, and four under gardeners, with ſtrict commands to accept no gratuity. They took poſſeſſion of his little incloſure the moment they arrived, and, having dug it many times over, manured and replanted it, leaving one of their number behind them as a ſettled ſervant in the family. This young man was ſoon ſollicited to aſſiſt the neighbourhood, and filled their kitchen gardens and fruit gardens with the beſt productions of every kind, which are preſerved and propagated to this very hour. What ſmall beginnings lay the foundation of good culture amongſt docile people!

But to return more immediately to the cultivation of lucerne. In a word it is highly unreaſonable to expect ſucceſs in the management of this plant *without care*, and highly improbable (if the ſeeds are good) to miſcarry *with due care*. It is true, many people have failed in the proceſs of this experiment; but then one is generally enabled to point out the error, as likewiſe the cauſe of ill ſucceſs, with tolerable exactneſs. To begin well in cultivating this plant is doing but little; rules and directions muſt be cautiouſly obſerved for three, or two years at leaſt, Few people make miſtakes in the beginning of an experiment: But, generally ſpeaking, after three or four months are expired, the maſter's attention and keenneſs wear off, and the bailiff or gardener (as ſometimes the raiſing of a lucerne-nurſery falls in the province of the latter) are extremely glad not to refreſh his memory. For the *one* does not like an additional trouble out of his department (a punctilio which has great weight with all ſervants:) And it is a maxim with the *other* never to admit any thing new in matters of

husbandry, but admire those sort of crops which *Columella* describes: Crops that can hold up their heads and prosper under all the negligence of a pretending cultivator: *Sustinent omnem coloni negligentiam.*[d]

It is true, many difficulties and discouragements attend making experiments. The continuance of life is as short as that of art is permanent:—And few husbandry experiments can be made oftener than once in a year:—Nor must we reason too much by analogy, from success in one production to success in another of a different species.—Attention also is required, and that even to the minutest circumstances:—And again, too many experiments die with the observer; which, tho' highly useful, did not appear considerable enough for human vanity to establish a system thereon.

Yet still all these difficulties and discouragements may be counter-balanced by the advantages which result afterwards to society; this *interpretatio naturæ*, as Lord *Bacon* expresses it, being far better than the *experientia literata*;[e] or, as he delivers the same sentiment with greater clearness in his essays, "Studies give directions too much at large, except they are

[d] Some parts of *Hispaniola* would agree well with such husbandmen, where the *Indians* only set fire to the savannas of long grass, and, having scratched the surface of the ground a little with a rake, let the maize into the soil with a setting-stick or dibble.

[e] *Advancement of learning*, Book II.

"Agriculture does not take its rise originally from reason, but from fact and experience. It is a branch of natural philosophy, and can only be improved from the knowledge of facts as they happen in nature.—Medicine has attained its present perfection only from the history of diseases, and cases delivered down.—But where are the experiments in agriculture to answer this purpose? When I look round for such, I can find few or none, except *Du Hamel*'s." *Home's Principles of Agricult.* p. 202.

This ingenious author might have applied to husbandry what his master, *Hippocrates*, said of medicine: Μὴ τῷ ΛΟΓΩ μᾶλλον, ἀλλὰ ΕΡΓΩ δεῖ νομίζεσθαι ΙΗΤΡΟΥΣ.

are bounded by experience." Nor is it any argument againſt experience to alledge, that it is ſometimes the child of chance, or of neceſſity.

From theſe and ſuch-like repreſentations, it may appear plain to ſome people, that lucerne cannot eaſily be freed from manifeſt diſadvantages by any other method of culture than what is here recommended. That it has uſually miſcarried, when ſown with ſpring-corn, after repeated trials in this kingdom, from the years 1577 to 1764, is well known to many readers. For common wild graſs, and particularly couch-graſs, may be called its deſtruction, if not its poiſon. Principally indeed by ſtarving the roots of it, but probably from its effluvia too.—This likewiſe I have always obſerved in plants of a different ſpecies that ſtand too near each other; they immediately, as it were by a declaration of war, contend for maſtery. The roots are conſtantly attempting depredations and incroachments upon each other: Whilſt the ſtalks, eſpecially thoſe of weeds, make the ſame efforts in longitudinal ſhoots; and *that* plant, which over-tops the other, provided the ſhoots are equally thick and ſtrong, always gains the victory, and, by over-ſhading and dripping upon its antagoniſt, forces it to dwindle away and periſh. This ſtruggling for life and maſtery draws up the plants too weak and ſpindling, and the conquered plant uſually dies. Now weeds, generally ſpeaking, are more hardy, ſavage, and hungry, than manured vegetables. If ſuch be the caſe, where is there a country to be found that abounds with foul graſs and weeds more than *England?* So that, if lucerne be ſown in the uſual way amongſt corn, like ray-graſs, clover, and hop-trefoil, no care can keep an acre clean. It may laſt, two years (only one crop being tolerable) and then muſt periſh in the common courſe of nature. A gentleman very lately made this experiment (in

good measure against his judgment) for the sake of farmers, in hopes of finding out a cheap, easy, and compendious method of raising lucerne; but the crop, at the end of fifteen months, was as near being overpowered and starved as can be imagined [b]; which made him venture to take up and transplant the few good roots that remained, which, being freed from the bad neighbourhood and incumbrance of coarse grass and other weeds, appeared to prosper very well. Again, if lucerne be raised in drills, according to the best directions hitherto given by our ingenious countrymen *Tull* and *Miller* (who, to do them justice, were the first persons, amongst our modern writers, that saw the great advantage of this grass, and pressed the culture of it strongly on the *English* nation) certain it is that such a method will greatly exceed the promiscuous sowing of lucerne with spring-corn. Yet still, in the practice of drilling [c], a considerable part of the seeds may be faulty, and then the rows will appear naked and unsupplied with herbage:—Nor can the hopper be

[b] *Si sit solum herbosum, vincitur* (medica) *et deficit in pratum.* Plin. *Hist. Nat.* lib. xviii. c. 16.

I never yet saw, that lucerne promiscuously sown ever got the better of weeds and common grass, though the seeds were sown as thick as possible. It is true, I have known wheat overpower weeds and grass; but wheat, in its infant state, is more hardy than lucerne, and grows more kindly in winter than even grass or weeds.

[c] We have observed, in the latter part of the preceding essay, that *Tull* was not the inventor of drill-ploughs, or the method of drilling seeds by an instrument; for the *Spanish* or *Austrian* sembradore was known more than half a century before *Tull*'s time. *Worlidge*, in the year 1631, has given us the print of an engine "for sowing corn, grain, or pulse, *&c.* at what distance, and in what proportion, you please" [*Syst. of Agricult.* folio, p. 17] But another countryman of ours, *Gabr. Plattes*, gave a description of such an instrument, long before *Worlidge* began to write; and sure I am, though assisted only by memory, that a *Quarto Treatise*, on setting corn in this manner, was published about the year 1606, written by one *Maxey* or *Massie*.

It

be ſuppoſed always to drop the little grains at preciſe diſtances plant from plant.—*Nevertheleſs, ſuch perſons as prefer* DRILLING *may reap great advantages from the preſent Eſſay, having the power to fill up all the vacant ſpaces with* TRANSPLANTED ROOTS.

With regard to the methods the antients took in ſowing lucerne, and the quantity of ſeed they uſed in ſowing any given ſpace of ground, I ſhall ſpeak at large in the *ſixteenth ſection* of this Eſſay: But ſhall mention here occaſionally, that, whilſt I was writing this, I received an account from *France* which informs me, that the huſbandman, about the middle of the laſt century, allowed in lucerne-ſeed a ſixth part of the weight of ſeed-wheat neceſſary to ſow the ſame ground; which amounts to an allowance of about 31 lb. of lucerne-ſeed to each acre; and correſponds in good meaſure, with *Hartlib*'s account mentioned in the *Teſtimonies concerning lucerne* [d]. But M. *Du Hamel*, by way of reſult from all his experiments and obſervations, allows a *great deal more* in promiſcuous or broad-caſt ſowing.

De Serres ſays, as long ago as in the year 1600, "That, if farmers, after all that has been ſuggeſted to them, ſhould be bold enough to venture upon ſowing lucerne with any ſpring-grain, let it be with *vetches*, and not with oats or barley; the vetch and lucerne being ſomething alike in growth and other qualities." This in part may be true: But I think the tendrils of the vetch will be apt to

It was a cuſtom in *China*, above ſeventy years ago (and how much longer one cannot ſay) to ſow wheat in drills, the lines being about half a foot aſunder.

Lettres Curieuſes & Edifiantes.

[d] Another perſon ſays, "Qu'il faut pour ſemer une luzerniére la ſixieme partie moins de ſemence que pour ſemer du froment; c'eſt a dire qu' au lieu de 5 ou 6 voiſſeaux de blé peſant 250 livres le tout, on n'en prend qu'un ſixieme, parce que la graine de luzerne eſt extrêment petite: Et qu'elle ne veut pas être ſemée trop dru, mais en quantité raiſonnable, & de maniere neanmoins que le champ en ſoit ſuffiſament & également couvert par tout."

ſtrangle the lucerne.—If ſuch a ſort of huſbandry is to be dealt in, I hope to ſupply a better ſucceda-neum [b].

M. Bertrand, paſtor of *Orbe*, in the *Pais de Vaud*, *Switzerland*, ſeems to ſpeak moſt conformably to my ideas of huſbandry, in an eſſay publiſhed by him about two years ago; namely, "That it is never right to ſow any ſeeds together of different ſpecies; but, in caſe you do, then remember to pitch upon ſuch plants as proceed in their growth *æquis paſſibus*, and ripen about the ſame time." Otherwiſe one will defraud the other.

Indeed *M. du Hamel*, in his *Elements of Agriculture* [c], publiſhed laſt year, ſeems to allow the practicability of raiſing lucerne and oats [d] together; more, as I apprehend, out of compliance with farmers (who love cheap, compendious methods) than by way of ſpeaking the reſult of his beſt thoughts and moſt mature experience: For he clogs the attempt with difficulties enough to deter even an enterprizing *Frenchman*; ſo that the cool permiſſion he allows ſeems to amount to a tacit diſapprobation. "If, ſays he, lucerne is to be ſown with oats, in the manner of ſowing oats and clover, care muſt be taken to mow the oats and lucerne together, at the time the ſeeds of the oats are formed,

[b] See the latter part of SECT. XVI.

[c] When *M. du Hamel* firſt publiſhed the experiments made by himſelf and friends, he was obliged to relate them year by year, as they ſucceeded each other. This method (though the trueſt and beſt method in matters of huſbandry) naturally threw the whole ſix volumes into no ſmall confuſion at laſt; nor was it in the power of any index to ſave the trouble of referring perpetually, but only to alleviate it a little. The author therefore, after all the experiments had been verified at large, and the juſtneſs and fairneſs of making them allowed by the public, reduced the reſult of them to one uniform ſyſtem, under general articles in two duodecimo volumes; and certainly no one could better methodize or abridge ſuch a diffuſed work, than he who firſt put the parts together.

[d] I ſhould think barley a leſs voracious plant than the oat.

formed, *in caſe the crop of the latter happens to be luxuriant.*—For, except this ſmall ſacrifice be made, the lucerne-plants will be over-ſhaded and ſtarved. —Beſides, the ground, before the lucerne and oats are ſown, muſt be pulverized with much labour and expence to an exquiſite degree of fineneſs."

Nor is it poſſible *then* to deſtroy the weeds at once. Of *ſome*, the leaſt fibre remaining will form a new plant: Witneſs couch-graſs, the bane of huſbandry. The ſeeds of *ſome* the wind will convey to you from a great diſtance;—the ſeeds of *others*, which might have lain dormant, and at length periſhed, may be brought nearer the ſurface by violent turning and diſturbing the ground; in which ſituation they will ſurely vegetate, when placed within due reach of the influences of the atmoſphere;—and, again, the ſeeds of *other* weeds only riſe periodically, after an interval of two and three years: So that theſe plants will re-appear, when the field is ſuppoſed to be abſolutely free from them.

Theſe remarks I have thought fit to annex to thoſe made by *M. du Hamel:* Who proceeds to obſerve farther, upon raiſing lucerne and oats by promiſcuous ſowing, that it will be extremely perplexing, the year after the oats are cut, to deſtroy the weeds irregularly diſperſed all over the field, the lucerne at the ſame time not being placed in lines with proper intervals. Beſides, he allows, that the oats and weeds (be your care ever ſo great) will defraud the lucerne-roots of their ſuſtenance; ſo that you muſt be obliged to manure the field copiouſly in the ſecond year.--Now whether lucerne, after ſuch precautions are taken, will ever proſper to any tolerable degree is much to be doubted: And, ſuppoſing there has been a commonly fortunate example or two in the more ſouthern parts of *France*, yet ſure I am that the ſame caſual ſort of ſucceſs cannot

be

be expected in *England*; and that for reasons above-suggested, namely, the abundance of weeds, and want of heat, dry weather, and sun-shine.

True it is, that, in some parts of *Italy* and *Spain*, the inhabitants sow lucerne with spring-corn, in order to prevent the scorching heat of the sun from burning the young lucerne-plants; but northern nations have nothing to fear in that respect: And thus what is *right* in them may be *absurd* in us.

—Different climates, and even a variation in slighter circumstances, call for different sorts of management. *Virgil*'s precepts, excellent as they are, may sometimes deceive us, when we apply them literally to *English* agriculture. Nay, some intelligent husbandmen, in *Italy*, have observed, that the main part of the *Georgics* was composed in the *Mantuan*, and not the *Neapolitan* state (where our poet afterwards resided;) for the rules of culture, laid down for the *moist deep soil* of *Mantua*, did not hold quite conclusive in the *shallower* and more *brashy* lands of *Naples*. And thus, in the *Asiatic Georgia*, the husbandman is obliged to overflow his corn, by bringing streams into it, when the neighbouring mountains are covered with snow: Whereas, in the islands of the *Archipelago*, where the heat perfectly calcines the earth, and rain seldom falls, except in winter, you may behold some of the finest corn-fields in the world; which serves to demonstrate another point of husbandry, namely, that all earths have not the same inherent nourishing juices; and that some lands may be compared to the camel; for the one takes in a quantity of drink, and the other takes in a quantity of moisture, sufficient to support them for a long continuance.

Therefore, upon the whole, where the heat of the sun is not intense, and where shade and moisture are no-ways wished for by the husbandman, it appears best, in general, *to sow seeds of one species by them-*

themselves; for (besides many other reasons) it has been imagined by several good judges in husbandry, that the effluvia of one sort of plants seem to hurt plants of another kind. The same likewise is reported to happen among trees; and many judicious observers, in matters of gardening, have assured me, than an orchard, planted in rows, with an apple-tree, pear-tree, plum-tree, *&c.* interchangeably in each line, will rarely prosper. Nor were these points unknown to the antient *Greek* writers on husbandry.——"In the same plantation," says *Florentin*, "dispose not your plants at random, nor mix together such as are of a different species." [f]

Of the like opinion is our countryman, Sir *R. Weston*: "sow clover," says he, "and other grass-seeds ALONE, and *not with spring-corn*: Therein altering the custom of *England*, *Brabant*, and *Flanders*, which is to sow it immediately, either with, or after the corn; for I found, by experience, in *Herefordshire*, that it will thrive much better *the first year*, and turn to more profit *alone*, than *that* and a crop of oats, *&c.* sown together will do." [g]——

—In

[f] *In Geoponicis.*

[g] See the *Discourse of Flanders Husbandry*, 4to, 1645, p. 17, 18—We apprehend the author of this work to be *the* Sir *Richard* WESTON who was ambassador from *England* to *Frederic* V. elector *Palatine* and king of *Bohemia* in 1619, and present at the famous battle of *Prague*; concerning which a curious relation of his, by way of letter, is still preserved in MS.

His *Discourse on Flanders Husbandry*, published by *Hartlib* in 1645 (who then knew not who the author was) contains about twenty-four pages in quarto: The *Legacy* to his sons, which relates also to the cultivation of their estates, consists of three quarto pages, and was written on his death-bed in 1645.—The *Discourse* has always been looked upon as a capital performance in husbandry.

It is remarked in the *Philosophical Transactions*, that *England* has profited in agriculture, to the amount of many millions, by following the directions laid down in this little treatise.

About twenty years ago a piece was ignorantly published under Sir *Richard Weston's* name, intitled, *A Treatise concerning*

the

—In his days, the *Flemings* allowed 10 pounds of clover-ſeed to as much land as anſwers the ſize of an *Engliſh* acre. Such was the practice when the clover-ſeeds were purpoſely intermingled with thoſe of oats or barley. At preſent, when the *Flemings* ſow clover alone, they allow 20 pounds of ſeed to an acre, which (though contrary to the cuſtom eſtabliſhed amongſt us at preſent) will be no bad example to the *Engliſh* huſbandman.

As to the inconvenience of ſowing graſs-ſeeds and corn together, we need not have recourſe, on this occaſion, to the pompous diſtinction of *ſympathy* and *antipathy* amongſt the antients, ſince Lord *Bacon* has explained the difficulty more clearly to us, and with great ſimplicity: "When plants, ſays he, require the ſame ſort of ſoil and nouriſhment, they hurt each other extremely, when they ſtand too near together."

Obeſt vicinia, altera alteram fraudante: [e] And again, *Gemini prædones terram inſident in mutuam perniciem.* [f]

But to return more directly to the ſubject before us.

In

the Huſbandry and Natural Hiſtory of England, 8vo; which performance is a poor, jejune abridgment of *Hartlib*'s Legacy, of which the true author was neither *Weſton* nor *Hartlib*, as we have obſerved elſewhere, but one *Robert Child*.

But to return to the ſubject which gave riſe to this note.

A writer of ſome experience in huſbandry makes the following remark, when he is ſpeaking of vetches, oats, or barley, ſown with lucerne:

"Pour le mieux, ſans ſe mettre en peine *du profit qu'on peut tirer de ces graines*, ou les coupe *avant leur maturite:* la luzerne en vant mieux, & y prend une nouvelle croiſſance.

"Ce mélange de ſemence dont on vient de parler, *ne'ſt gueres en uſage que dans les pais meridionaux*, car dans ceux où les climats ſont temperez, on ſeme *la luzerne ſeule:* Elle profite alors de tous les ſels que la terre on elle eſt, peut contenir."

Nouv. Theatr. d'Agricult. par St LIGER, 4°, p. 382.

[e] *Sylv.* Cent. V. N°. 480, 481, 482, &c.

[f] *Ibid.* N°. 429.

In the method of cultivating lucerne, which is here recommended, an acre will be found to contain about ſuch a number of choſen healthy roots as the ground is capable of ſupporting, and admit a greater number of them than the reader will be apt to imagine, *prima facie*. For it will hold, according to my firſt experiment, about 26,000 plants: But; if the ground be clean, rich, and well conditioned, it may be more adviſable to obſerve the diſtances ſpecified in the 26th page of this Eſſay. Upon which principle, the acre will contain about 13,000 plants; and this is the number, all things conſidered, I am moſt inclined to recommend. For the produce of ſuch an acre will be full as large and profitable as the *former*, and the ground will be managed with leſs expence and more convenience. So that no one inſtance can better verify the old huſbandry proverb, delivered down to us by *Heſiod*:
—Πλέον ἥμισυ παντὸς. *Half is more than the whole.*

It may be obſerved farther, that, in tranſplanting lucerne, there will be one advantage (and that no ſmall one) which can never be obtained in drilling, or promiſcuous ſowing; each root will ſtand at a proper diſtance from its neighbour, and receive its allowance of food in due quantity, without diminution.—In the next place, you will ſeldom ſee a plant wanting, and rarely (except by miſtake) a plant ſupernumerary: But, if a few ſets ſhould chance to die, it will be eaſy to ſupply the vacant ſpaces from the nurſery, and that, as people find by experience, in any moiſt Day, from *April* till the middle of *September*.

There is another advantage which ariſes from tranſplanting lucerne; for, by cutting the tap-root, [b] you

[b] It was a received opinion, amongſt our anceſtors, from time immemorial, that the amputation of a tap-root, in tree or plant, was dangerous, if not fatal; but *Gabriel Plattes*, about 150 years

you prevent its penetrating ten or twelve feet perpendicular into the ground, which the plant naturally does in three or four years, except it be obſtructed by a ſtratum of rock, or chilled at root by weeping ſprings, or finds admiſſion in a bed of cold watery clay. Then the crop makes a poor appearance, or, perhaps, goes off all at once.

It may be aſked here, by way of curioſity, what a plant of lucerne will come to, left alone to itſelf, the tap-roots and herbage not being cut, and without tranſplantation? To which the anſwer is, that it will grow ſlowly (for cutting accelerates its growth) but, if the ground be good and kept clean, and the root has room and power to force downwards, it will form ſomething between an herb and a low buſh, like young *falſified* cytiſus.

I here revive the name which our countrymen gave this plant in the year 1597. Some have ſince called it *baſtard cinna* [c] (I ſuppoſe they mean *ſenna*. [d]) It is the *cytiſus maranthæ* of old herbaliſts; and the *French* give it the name of *baguenauds & baguenaudiers*.

Nor may people who hand-hoe or horſe-hoe lucerne, give themſelves much pain about breaking or cutting off a lateral root accidentally: Not but that ſome care and caution muſt always be uſed; however, what ſeems to injure the parent-plant proves, in the end, no-ways diſadvantageous to it; for horizontal, or ſide-roots, thus cut, or broken, puſh forth new roots and filaments laterally: And thus

years ago, ſeems to be the firſt who had experienced, that ſuch an operation might be performed, not only with ſafety, but ſucceſsfully.

Pract. Huſb. improved, or a *Diſcovery of infinite Treaſure*, 4to. 1656, p. 15.

[c] See Mr. *Heron*'s ingenious account of cultivating this plant in *Maxwell*'s Huſbandry, p. 181.

[d] The *baguenadier*, ſays *Du Hamel*, is of the *colutæa* or *ſenna* kind.

thus the ſuckers, or tubes that ſuck nouriſhment, are multiplied by a cauſe which had the appearance of leſſening their number.—Yet *tranſplanted* lucerne will no-ways bear ſuch rude treatment as the antients ſometimes gave to *untranſplanted* lucerne, when they thought fit to make it undergo the diſcipline of harrowing. [c] But this point ſhall be conſidered more at large in our XVIth SECT. whilſt, in the interim, I ſhall only obſerve, that ſuch perſons as ſow lucerne by broad-caſt ſowing, [d] in the manner of clover, cannot poſſibly (at leaſt with advantage and profit) free the earth from weeds, and looſen the ſoil any *other way*.

We will here make a few ſhort obſervations upon *tap-rooted* plants like lucerne.

Roots which *puſh immediately from the ſeed* are, generally ſpeaking, and almoſt always, of the *tap-rooted* kind; they penetrate perpendicularly into the earth, till they find obſtruction; but if you cut them by deſign, or break them through accident, they change their direction, and from that time (as particularly in the caſe of lucerne) the ſide-ſhoots, or branches from the tap-roots, ſpread themſelves horizontally, and are found, by experience, to be ſometimes very nearly as large as the primitive root, from

[c] COLUMELLA, Lib. ii. c. 2.—The tynes, or teeth of theſe harrows, were made of wood, it being a received doctrine, with the old *Roman* huſbandman, *quod ferro locum tangi non licebat. Pallad.* Lib. v. *Menſ. April.* Tit. i.

This operation of harrowing muſt have been performed by them in the *ſecond* year, before the plants had formed large crowns, or bulbs, above-ground; for otherwiſe ſuch violence (not to mention the tread of the cattle) would have torn and bruiſed the crowns, and conſequently greatly injured the plants. —It is true, the tap-roots in their ſecond year (having ſuffered no amputation) were not very liable to be removed from their places.

[d] Broad-caſt, or promiſcuous ſowing, is diſperſing or ſpraining out the ſeeds by a caſt of the hand, in ſuch manner as the ſeedſman commonly ſows wheat.

from whence they took their accidental birth. Theſe lateral branches and fibres extend farther from the parent-root than is commonly imagined, and are of ſo fine a thread-like nature, as often to eſcape our notice, eſpecially if they derive an adventitious colour from the ſoil, which frequently happens.—— All this may be exemplified, to ſome degree, even in a carrot, which ſeems to conſiſt of a ſingle perpendicular root, ſending forth a few lateral filaments; but theſe filaments branch out afterwards into numberleſs others of a finer texture, which ſpread conſiderably, though, at the ſame time, the human eye can rarely diſcover them, except with uncommon attention and accuracy. Nay wheat, which appears to us to have nothing more than one tuft of ſhallow lateral roots, will, if the ground be deep, and deeply ploughed, ſtrike down perpendicularly, 15 or 16 inches.

On the contrary, horizontal or lateral roots increaſe in length and circumference, as they approach nearer the ſurface, and enjoy the influence of the ſun, air, dews, &c. eſpecially if the ground be freed from weeds, and looſened by hand-hoeings and hoe-ploughings; for the roots of all plants ſeek to expand themſelves, or deſcend perpendicularly, upon ſuppoſition that they can find room and force their way.

The firſt production from the ſeed of tap-rooted plants is the root, which deſcends perpendicularly into the earth. Whenever a tap-root is cut off (though the part amputated be only half an inch long) it never afterwards increaſes in length, but, perhaps, ſome freſh fibres and filaments may puſh out juſt above the place where the root was cut off, and theſe may ſhoot down perpendicularly a little way. Now, whether the tap-root be ſhortened by cutting;—whether it meets with an impenetrable

ſtratum of earth or ſtone; [a]—or whether it has puſhed (without obſtruction) as far as its nature and well-being require; true it is, that, in all theſe caſes, it ſends forth ſide-roots.

If we conſider a root of lucerne, with all its lateral ſhoots, fibres, and filaments, it diſtributes itſelf in the earth, much in the ſame manner as the branches from the ſtems extend their foliage in the open air.

The horizontal or lateral roots of lucerne, after the primary tap-root is ſhortened, increaſe their ſize almoſt to that of the tap-root in a ſtate of nature, and grow ſtronger and more vigorous, in proportion as they approach nearer the ſun, and enjoy the benefit of a pulverized earth, together with the kindly influences of the atmoſphere, and find themſelves within the reach of manures. Theſe ſide-roots *ramefy* more viſibly than the tap-root: And, if ſhortened by cutting, digging, or ploughing, puſh forth new fibres and filaments. But ſtill no ſevere wounds muſt be inflicted on theſe lateral roots; which makes me, upon the whole, no great friend to the late revived project of *harrowing* lucerne. Hoeing and digging, carefully managed, will be of ſervice. The hair, and the nails of the human body, will grow the faſter after cutting; but the amputation of a thigh is too ſeverely felt. Hardy as lucerne may be, in ſome inſtances, it is no polypus. I have ſeen a whole plant languid and diſcoloured, and, upon digging it up, have diſcovered nothing more than a little, lively, red worm that was preying on the root. [b]

[a] I have known lucerne roots ſometimes penetrate the crevices of rocks; and, at other times, I have ſeen the roots repelled or driven back by commonly hard earth.

[b] When the leaves of lucerne turn yellow or white, or are variegated with yellow and white, then the plant is in an unhealthy, but not dangerous ſtate; and, generally ſpeaking, ſome mif-

The more plants extend their roots in the earth, the more their herbage expends and flouriſhes in the open air; the finer is its colour, and more nutritious its juices; and, as plants cannot ſearch their food from place to place, at a great diſtance, as animals do, it is uſeful to give them liberty of procuring nouriſhment, as far as their nature (obſtructions removed) allows them to point their courſe.

Perennial roots require more room to ſpread themſelves, and more food to ſupport them, than *annual* roots. Of courſe the *former* cannot be kept too clean. A perennial weed, cloſe to a perennial uſeful plant, goes halves with the latter in point of food. Annual roots, in general, have weak extemporary fibres juſt calculated for their ſhort duration; but, on the contrary, the ſmall thread-like treſſes which ſhoot from the roots of perennial herbs, though they often periſh in a ſevere winter, yet the more vital part of the root remains unhurt, and new filaments puſh out, and ſpread themſelves abundantly at ſpring.

How long lucerne may laſt cannot be known by the experiments which are here related, namely, from the ſpring of 1757 to the beginning of the year 1764; but ſome perſons of credit have obſerved the plants to continue in good ſtrength and health near twenty years. [I ſuppoſe they mean here and there particular plants, and not a whole plantation.——] *Tull*, indeed, tells us that, except lucerne be choaked or ſtarved by graſs and weeds, he hardly knew when to ſay it will die a natural death; and probably it may not prove the *leſs long-lived* for being *tranſplanted:* Since hand-hoeings, horſe-hoeings, and digging, will give new ſtrength and health to the plants.—The ſpreading of the roots will be facilitated by looſening the ſoil, and letting

miſchievous inſects will be found preying on the roots. Soot-dreſſings are here expedient.

letting in the good influences of the atmoſphere; —their growth alſo will be augmented by giving them that additional nouriſhment of which the weeds defrauded them;--and, in the laſt place, all manures will more eaſily reach them: For thus much is a certain fact in huſbandry, that, when the ground is rendered clean, light, and penetrable, the roots love to expand themſelves, in order to procure a greater quantity of nouriſhment.

I fairly acknowledge that I am not enabled, from my own experience, to fix the common duration of lucerne, whether tranſplanted or drilled: (and that from no difficulty in the thing itſelf, but becauſe a ſufficient number of years has not elapſed ſince making my experiments;) but thus much I can take upon me to ſay, from my own knowledge, that lucerne ſown at random, or by what we call promiſcuous ſowing, as the ploughman ſows ray-graſs and clover (whether with or without ſpring-corn) will not laſt to any tolerable purpoſe above two years, or three at moſt. But, as this plant is of the greateſt uſe and value, where land is dear and ſcarce, as near cities and towns, I ſee no reaſon to doubt, but that the ſame ſpot of ground may be continued as a lucerne plantation for half a century at leaſt. For if the rows are three feet four inches wide (which I look upon to be a *ſine qua non*) then, whenever the old lucerne decays, new lines may be planted in the middle of each interval, which has lain fallow, and alſo been manured and pulverized for a conſiderable number of years; and thus progreſſively, *vice verſa*, to a long continuance.

Not being able, therefore, to give poſitive ſatisfaction concerning the continuance of lucerne rightly managed, [b] I ſhall propoſe ſomething that

[b] M. *du Hamel* obſerves, by way of reſult from his experiments, that nine or ten years is the common date of tranſplanted lucerne, except it be managed with great art and ſkill.
Elemens d'Agricult. Tom. II. p. 130.

is not merely a query, and which, perhaps, may give the reader an equivalent information. In a few words it is as follows: When lucerne is grown old, and the owner propoſes to break up the plantation, layers might be made from all the principal ſtalks, and removed into freſh ground. Theſe layers, in all probability, may ſucceed extremely well, according to ſome few experiments made abroad in the years 1755 and 1756.

Again, it may be obſerved to the credit and advantage of our iſland, that lucerne proſpers as well here, as in any other country; ſince the moſt accurate and ſkilful cultivators of it in *France*, *Italy*, and the territory of *Geneva*, never cut their plantations oftener than *ſix* times a year, which happens not unfrequently with us: Nay, one of my correſpondents believes that he cut *ſeven* in the year 1760; [g] and, in addition to all this, one may remark, that a ſingle plant rightly managed will often out-weigh 10, or 15, that have been raiſed like common graſs-ſeeds with ſpring-corn. It is true, the drilled crops make ſometimes a four-fold better return, than thoſe laſt mentioned; but *tranſplanting* ſeems to be the ſort of huſbandry that deſerves the preference. Yet even this idea is ſuggeſted to the public with modeſty and diffidence: Both ways are good; and I leave the reader to his own choice and inclination; adding only *one* precaution, which is, *That he ſhould take care, when he raiſes lucerne by drilling, to fix upon a ſoil that is rich, deep, and no ways ſtubborn or clinging; free from weeping ſprings, ſtratums of clay, rock*, &c.

Nor needs one be ſurprized that lucerne appears to have a liking for the *Engliſh* ſoil, air, and climate; for many wild ſorts (no-ways contemptible in their kind) have been diſcovered in low meadows and common

[g] In *Switzerland* lucerne is rarely cut above four or five times a year.

common upland paſturages: Not in one county, but in ſeveral. Indeed, there is a vegetable ſomething like it, which cattle uſually refuſe to eat (and the ſame happens in *France*, *Italy*, and *Spain*,) but *that* is a ſort of plaiſter-melilot or bituminous trefoil, which may eaſily be known by rubbing or bruiſing the leaves, and then ſmelling to them. I once knew a gentleman who, by the miſtake or fraud of a ſeedſman abroad, was ſo unfortunate as to raiſe a plantation of this diſagreeable herb. I have ſeen a plant very like it, in taſte, ſmell, and aſpect, in ſome fields near *Wells* in *Somerſetſhire*, particularly in the neighbourhood of *Okey-hole*.

As to the expence and riſque of cultivating ſmall quantities of ground, agreeably to the method here laid down, it is to be hoped that curious gentlemen will not be deterred by ſome few minute difficulties or objections, but give the preſent experiment fair, patient, and repeated trials; [a] for neither the out goings nor the hazard will be very

 conſiderable

[a] "There is nothing wanting but a willing mind to make this country *(England)* the paradiſe of the world. If *gentlemen* would be pleaſed to begin firſt, and lay the corner-ſtone of this building, all would follow without queſtioning; for gain, the loadſtone of the world, being laid a little open by practice, would draw the reſt." *Gab.* PLATTES's *Diſcov. of Inf. Treaſ.* 4°. 1656, p. 2.

As great a genius as this writer was, the public allowed him to drop down dead in *London* ſtreets with hunger only; nor had he a ſhirt upon his back when he died. He bequeathed his papers to *S. Hartlib*: Whom a cotemporary author addreſſes in this manner: "None (but yourſelf, who want not an enlarged heart, but a fuller hand to ſupply the world's defects) being found, with ſome few others, to adminiſter any relief to a man of ſo great merit." *Letter to* Hartlib *from* Flanders, 1650.

Another friend of *Hartlib*'s gives *Plattes* the following character: "Certainly that man had as excellent a genius in agriculture as any that ever lived in this nation before him, and was the moſt faithful ſeeker of his ungrateful country's good. I never think of the great judgment, pure zeal, and faithful intentions of that man, and withal of his ſtrange ſufferings and manner

conſiderable, [b] it having been remarked, by a celebrated genius in huſbandry, *Q'une bonne culture coute moins q'une culture languiſſante.*[c]—And we the rather lay ſome ſtreſs upon this article, becauſe no invention has ever failed to receive improvements, when the intelligent part of the *Engliſh* nation have thought fit to purſue their point in good earneſt. But at preſent it is no-ways our intention to perſuade farmers

manner of death, but am ſtruck with amazement that ſuch a man ſhould be ſuffered to fall down dead in the ſtreets for want of food, whoſe ſtudies tended to no leſs than providing and preſerving food for whole nations, and that too as with much ſkill and induſtry, ſo without pride or arrogance towards God or man."

C. D. *in a Letter to* Hartlib, 1653. *Legacy*, p. 183, 184.

Hartlib, as far as can be learnt, publiſhed but few poſthumous papers of *Gabriel Plattes*; and indeed an author, ſo extremely poor as this unfortunate perſon was, would in all probability have ſold his writings to the bookſellers, had they been ſo far finiſhed as to deſerve publication.

The pieces already publiſhed are theſe which follow:

Practical Huſbandry improved, or, *A Diſcovery of infinite Treaſure*, 4°, containing 120 pages, 1656.

A Diſcovery of ſubterranean Treaſure, 4to, 1638. About three ſheets.

Mercurius Lætificans, 4to. 1644. Twelve pages.

Obſervations and Improvements in Husbandry, accompanied with twenty Experiments, imparted to S. Hartlib *by* Gab. Plattes. 32 pages, 4to, 1653.

This author had a bold adventurous caſt of mind, and ſeems to have preferred the faulty ſublime, in matters of invention, to the faultleſs mediocrity. As to his MS. intitled *Art's Miſtreſs* containing a ſeries of obſervations and experiments in agriculture for fifty years, and in all probability the moſt valuable in matter, as well as moſt conſiderable in ſize, of all his writings, we have ſpoken thereof in the Iſt Eſſay.

In a letter to *Hartlib*, *May* 14, 1644, he mentions a work of his called, *The Treaſure-houſe of Nature unlocked, and ſet wide open to the World*, &c. Whether this performance was ever printed is more than I know, or whether it be not the tract firſt mentioned in this liſt, which I am partly inclined to believe.

[b] A plantation of hops laſts leſs time, is more liable to accidents, and doubly more chargeable, before any profit can be received.

[c] Le marquis de MIREBEAU.

farmers (at leaſt ſuch as are in low circumſtances) to quit their *little certainty* for an advantage which may appear to them quite *uncertain*.

Let them wait at leaſt for a few years, in hopes ſome cheaper and more compendious method may be diſcovered for their ſakes; and, if at preſent they make any experiments, let them be in *ſmall*.

The firſt point of conſideration, when I undertook to recommend *tranſplanted* lucerne to the public, from my own experiments, *was to bear conſtantly in mind whether the profit counterbalanced the expences, and labour of culture, and that in a double or even treble proportion:* Since, otherwiſe, I was doing little more than poſtponing *utility*, for the ſake of introducing a new ſort of husbandry which only deſerved to be called *ingenious*. But this article ſhall be exemplified, more at large, in the Vth and VIth ſections of the preſent Eſſay. Upon the whole, I have paid a ſcrupulous deference to the ſage advice of the antient writers on agriculture. "No man in his ſound ſenſes," ſays *Varro*, "would propoſe to expend more on any branch of husbandry, than he ſees plainly he can make himſelf amends for; [d] as the principal point in theſe matters is to take care that the expences exceed not the profit." [e] And a writer, ſoon after the time of *Varro*, aſſures us, "That it is with fields, as with a rich man; little wealth will remain, if he be of an expenſive extravagant turn." [f].

I am well aware, even upon a ſingle moment's reflection, that every improvement in husbandry, like the preſent, muſt meet with *ſome* oppoſition;

[d] *Nemo ſanus debet velle impenſam ac ſumptum facere in cultura, ſi videt non poſſe refici. De Re. Ruſt.* lib. i. c. 2.

[e] *Summa enim ſpectanda ne in ea re ſumptus fructum ſuperet.* Ibid. c. 53. p. 69.

[f] *Agroque, ut homini, quamvis quæſtuoſus ſit, ſi tamen ſumptuoſus, non multum ſupereſſe.* PLIN. *Hiſt. Nat.* lib. xviii. c. 5,

for the force of cuſtom and prejudices in agriculture are only to be checked by imperceptible degrees and gentle meaſures. Thus, in *Ireland*, it was almoſt an immemorial practice to make horſes draw by their tails; nor was it unuſual for the inhabitants, in thoſe unenlightened ages, to ſet fire to their ſtraw in order to get out the corn. It is a common cuſtom with farmers, in ſome parts of *Bretagne*, to burn their dunghils, and ſpread the aſhes on their lands.

Many *Engliſh* farmers, to this hour, allow a change of ſpecies in grain: As, for inſtance, that barley, ſown in ſpring, has been metamorphoſed into oats at harveſt. As to the ſuperſtitions of huſbandmen, in various countries, concerning the hag, ſhrew-mouſe and barberry-tree, not to mention their accuſing and hanging old women for conjuring up blights, mildews, and hurricanes, we have already ſpoken ſufficiently in the 195th page of the preceding Eſſay, with relation to the amazing force of prejudice, and the mental ſlavery that has been occaſioned by an habitual train of thinking. For cuſtom, according to my Lord *Bacon*, "familiarizes us, by degrees, even to poiſons, infections, exceſſes, and torture:"[g] "Being in truth," as he obſerves elſewhere, "the principal magiſtrate of human life;[h] ſo that education, is, in effect, little more than a good cuſtom."—Yet nothing ought to diſmay the man who is a true lover of agriculture: He may meet with objections and obſtructions, difficulties and diſappointments, at his firſt ſetting out, and even in his middle courſe: But at length, by ſlow degrees, will be maſter of the race:

——*Cæloque invectus aperto*
Flectit equos, curruque volans dat lora ſecundo.

Or,

[g] *Natural Hiſt.* Cent. I. N°. 61.
[h] *Idem*, Eſſays, N°. 40.

Or, if this inducement may appear too enthuſiaſtical, let the diſcoverers of important improvements comfort themſelves with a plain *Spaniſh* proverb: *La verdad como el oleo ſiempre anda en ſomo:* Truth, like oil, always mounts uppermoſt. Yet ſtill it ſhall be allowed (and that with ſome reluctance and mortification) that *preſcription* and *cuſtom* are two fortreſſes that often hold out a long ſiege.

It were to be wiſhed, therefore, that individuals, (and theſe ought to be the nobility and gentry, whoſe example and influence will have ſome effect on the neighbourhood round them) would give a part of their attention to the art of agriculture, and making improvements in it; and then, as a noble author obſerves, who thought not the ſubject we are now treating of beneath his inquiries, if the ſtate thinks fit to add its approbation and patronage, the encouragement is given, and the point deſired obtained: "For commonwealths and good governments," ſays he, "nouriſh virtue grown, but do not much mend the ſeeds." [1]

As I am now recommending the cauſe of huſbandry, not only to the great, but even to the *rulers* of ſtates and kingdoms, let it be permitted me to obſerve, that (beſides the concurrence of common ordinary aſſiſtances) nothing in *our cold northern climates*, but the ſun-ſhine of the ſovereign, can ripen the productions of agriculture to due maturity: And this ſun-ſhine muſt be powerful (as it happens in a *Swediſh* or *Ruſſian* ſummer) if ever we hope to ſee the fruits carried on to good perfection in a ſhort ſpace: And then not only our preſent demands will be ſatisfied, but ſomething will remain for our ſupport in the long winter which is to ſucceed.——Husbandry will flouriſh, even in lands which have a temperament not quite favourable to culture, when *another* emperor ſhall erect *another* public

[1] *Idem*, Eſſays civil & moral, *Num eod.*

public inſcription to this effect: REDIIT CULTUS AGRIS.[a] On which account I am inclined to believe, upon ſecond thoughts, [b] that *Auguſtus commanded Virgil* to write his *Georgics*, at the ſame time that *Mæcenas requeſted* him:—And indeed it is incumbent upon every wiſe and good prince, (Ποιμὴν λαῶν, or a *ſhepherd of his people*, as *Homer* calls him) not only to protect, but feed his flocks.

It is well known that the founders of three of the moſt renowned monarchies in the world were ſhepherds; and it is almoſt as well known that the ſubject of huſbandry has been adorned by the writings and labour of more than *twenty* kings.

When *Mahomet* the IVth. was depoſed, this, amongſt other reaſons, was aſſigned as the principal one, namely, that he would not allot a part of the day to husbandry-labours, according to the law of the *Koran*, and the practice of his predeceſſors. [c]

As the families of many illuſtrious *Romans* adopted ſurnames from matters of husbandry (of which it would be needleſs to produce examples;) ſo the eſcutcheons of many of the greateſt monarchical families, amongſt the moderns, are taken from rural objects, as the *roſes*, the *lilies*, &c. &c.

It has ever been thought by the wiſer antients, that a good cultivator would always make an able political or military governor. Hence *Abdolonymus* was ſummoned from his farm, in troubleſome times, to be made a king. [d] Hence many of the *Roman* dictators were called from the plough to aſſiſt the government in the higheſt emergencies of war; and, when they had performed their hard day's ſervice, they returned to their rural labours of cultivating a little tract of land, which, at preſent, would ſcarcely make

[a] This relates to the Emperor *Auguſtus*.
[b] See Eſſay I.
[c] *Dryden*'s Preface to *Virgil*'s Paſtorals.
[d] HERODOT. *Couleius de* PLANTIS.

make a kitchen-garden for a contracter, or ſtock-jobber, at his country palace.

But I will dwell no longer upon this topic, except it be to ſhew (that I may avoid any imputation of being partial to agriculture) that it is incumbent on every wiſe prince to pay the ſame attention to commerce and home made manufactures, as to the culture of land; and hence it has been obſerved by the fineſt writer in the laſt century, "That *Charlemagne*, eight hundred years ago, ordered his children to be inſtructed in *ſome* profeſſion; and, eight hundred years yet higher, that *Auguſtus* wore no cloaths but ſuch as were made by the hands of the empreſs and her daughters; and *Olympias* did the ſame for *Alexander* the Great."

And now for the ſake of method, and rendering my remarks upon lucerne as uſeful as it lies in my power, I ſhall confine myſelf to a certain number of particular heads, comprehended in ſeparate SECTIONS, premiſing only one general remark by way of introduction.

It is highly expedient, before we undertake the culture of any uſeful plant, to inform ourſelves (ſo far as we are able to procure knowledge) what the ſpace of ground may be that each root requires in order to carry the plant to its full ſize and perfection. This knowledge cannot be aſcertained merely by the judgment of the eye, provided we were to take up any plant in queſtion with our utmoſt care, and examine the ſpreading of the roots and fibres; many of which *latter* would be broken off, and all the appendant capillary filaments be loſt: For moſt roots ſend forth from their ſmalleſt viſible ſhoots and branches (and that to a conſiderable extent) an infinite number of capillary tubes and threads, which ſpread and mat like the treſſes of hair on an human head. This is eminently perceived in *fibrous-rooted* plants, and (in a leſſer though very ſurprizing degree) in *tap-rooted plants*, whoſe roots

are

are *bulbous*. I have known an hyacinth or iris, placed in a water-glaſs for blowing flowers, ſhoot forth ſuch a quantity of roots, fibres, and filaments, that they ſeemed to form a ſort of peruke or buſh of hair. But how ſmall a part of this will be diſcovered, if a plant of the ſame ſpecies be dug up from a garden?

If the earth be good, and duly pulverized, it is certain the roots will expand themſelves in *ſuch* earth almoſt as freely as in water. The farther theſe filaments extend, the greater ſtore of nouriſhment they convey to the plant; for, by the laws of the Supreme Being, plants always ſpread, if they find a paſſage and food: *Qua data porta, ruunt*, &c.

To aſcertain this, you may, in any hard, dry, half-barren, braſhy field, near a live hedge that ſtands on level ground, dig a trench three feet deep, and eighteen inches broad; cut it down ſtraight, without mangling or breaking the ſides; and, having removed the bad earth, fill up the vacancy with good mold well pulverized. The roots of the ſhrubs will ſoon point their courſe to this better ſoil; they will *there* make amazing ſhoots, and flouriſh exceedingly: But, when they reach the hard, barren wall, or boundary of natural earth, they recoil immediately, and, forming a curve, will ſpread themſelves afreſh with a retrograde motion in *that* earth where they find food and free paſſage.

This may be called the *Inſtinct of Plants*.

I have plucked up roots of fine common wheat at harveſt-time, which ſeemed to me to have penetrated not more than ſix inches into the ground, and appeared poorly ſupplied with fibres. But, from better obſervations and experiments made afterwards, I have reaſon to conclude, that, if due ſpace be allowed to plants, and the earth is found ſufficiently penetrable, theſe treſſes that iſſue from fibrous roots like wheat, or tap-roots like lucerne or ſainfoin (after amputation of a part of the tap-root)

root) as alſo the filaments or branching treſſes that proceed from the roots of turnips and many ſuch-like husbandry-vegetables, will extend themſelves to a circle of eight, ten, or twelve inches diameter in every ſenſe. Do we not therefore, according to the *Old Husbandry*, ſow moſt ſeeds too cloſe [b]?

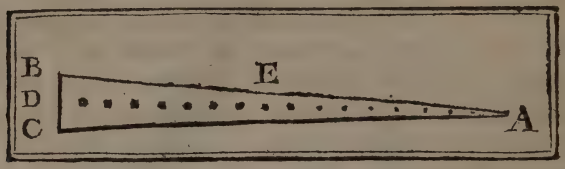
And here I aſk pardon for admitting an expreſſion which is not common in books of botany, namely, *the treſſes of the roots of plants*; but, to ſay truth, I had an inclination to ſubſtitute an equivalent for that elegant *French* term, *la chevelure de racines de plantes.*

The roots of *tap-rooted plants* are leſs *filamentoſe*, or hairy, than thoſe of *fibrous-rooted* plants; yet ſtill the former throw forth abundance of ſmall ſhoots, like ſo many rays; which form a ſort of globe like the ſolar rays breaking through a miſt. Thus, for inſtance, the root of a lucerne or ſainfoin-plant, which in its natural growth has ſomething of the look of a young carrot, ſpreads (in like manner as a carrot does) its fine hairy filaments to a far greater diſtance than moſt people imagine; but theſe threads are ſo exquiſitely ſmall, and ſo liable to break (being almoſt as tender as a cob-web, and at the ſame time quite aſſimilated with the earth round them in point of colour) that it is very difficult for the ſharpeſt human eye-ſight to diſcover many of them, except with uncommon care and attention.

In order to form a reaſonable conjecture concerning the extenſion of the roots of plants uſeful in husbandry, together with their appendage of fibres,

[b] If the common farmer ſows any one ſort of ſeed too ſparingly in the broad-caſt manner of ſowing, it is the ſeed of clover and trefoil, of which he uſually allows 6, and ſometimes 8 lb to an acre: Whereas if they are ſown without a mixture of corn (as I would always recommend) 20 lb are not too great a proportion for each acre. Such practice will alſo increaſe and continue theſe commonly tranſient crops at leaſt a year longer than uſual.

bres, (whoſe contexture and ratification are of ſo exquiſite a nature) it is in the power of almoſt every perſon concerned in agriculture to make the following cheap, eaſy, and compendious experiment, which took its riſe in our country:



In a field that is well ſituated, and which has not been broken up, for many years, fence in a ſtrip of ground in ſuch manner that the fence or hedge may not ſhade the plants ſown; then dig a piece of earth in the triangular form above repreſented, and marked by the letters A. B. D. C.; let its length be twenty yards from A. to D. and the breadth twelve feet from B. to C. the ſpace dug terminating in a point at A. Dig this ground effectually, and pick it clean from large ſtones and weeds, remembering firſt to cut down, one ſpit deep, with a ſharp ſpade, the out-lines or boundaries of the ſpot to be dug; and, in the courſe of digging, be careful not to break or looſen the earth on the outward ſide of the lines firſt traced out, and that for a plain reaſon.

Then ſow in the twenty dotted holes, which form a line from D. to A. twenty ſeeds (one in an hole) of the largeſt ſort of turnips, or any other plant, diſtances changed, according as you imagine they want more or leſs room; uſing the hoe frequently to keep the ground looſe, and freeing your experimental crop from the neighbourhood of bad herbs.

Now, if the plants at or near the point A. appear at the uſual time of maturity to be ſtarved or ſtunted, it is becauſe the roots wanted room, and could

could not penetrate the hard ground that ſurrounded them.

If the turnips, for example, become larger and carry a better aſpect, in proportion as they approach the middle part of the cone marked E. where the pulverized earth is four feet broad, it may be inferred, that the roots of theſe turnips extend themſelves near two feet each way in their lateral fibres; and again, if the remaining plants from E. to D. are of a ſize and colour nearly equal to thoſe at E. there is reaſon for concluding that their roots, *&c.* ſpread no farther than two feet [k].

SECT. I.

Of the Beauty and Wholeſomeneſs of Lucerne.

LUCERNE is one of the handſomeſt of all the *graſſes* which are called (improperly enough) *artificial* [l]: And ſome ſorts of it are admitted into gardens on account of their ſingularity. The flowers of common kinds are ſometimes red, and ſometimes purple: And the aſpect of them, when they cover a large field, has ſuch a bright beautiful glow at a diſtance, that one would think *Claudian* had a field of lucerne or ſainfoin in his eye when he ſaid,

Quod gelidi rubeant alieno gramine *menſes.*

This vegetable is looked upon to be wholeſome for men as well as cattle; nor is the taſte of it diſpleaſing. *Dioſcorides* ſays, that the ſeeds are medicinal and palatable when mixt and eaten with table-ſalt [m];

[k] *Culture des Terres.* Tom. I. p. 5.

[l] In compliance with cuſtom we call lucerne, ſainfoin, trefoils, *&c. graſſes*, though perhaps the propriety of the expreſſion may be doubted. Concerning *artificial* graſſes, ſee note to p. 37.

ſalt [m]; and perſons of repute have aſſerted to me, that the inhabitants of the ſouth of *France* give the leaves a place among ſpring ſallad-herbs. This is probable enough; for they taſte like creſſes, or naſturtian.—The leaves, infuſed in boiling water, have all the fragrance of fine new made hay; and the huſk that invelopes the ſeeds has much the ſame taſte as the pod of a pea.

Our countryman *Spencer*, in one of his Paſtorals, deſcribes a noſegay or garland that was to be preſented to the ſhepherdeſs *Eliza*, under which name he repreſents the perſon of Queen *Elizabeth*. Amongſt other flowers he takes notice of *coronations*, [i. e. carnations) and *ſops in wine* [n]. We aſked many ſkilful botaniſts what plant could be here meant, but, receiving no ſatisfactory anſwer, at length diſcovered, in a writer cotemporary with the poet, that *ſops in wine* were the *meadow lucerne*; whoſe flowers probably were thrown into wine and water, as borage and bugloſs are, to give the beverage a pleaſing taſte, and therefore were called *ſops in wine* [o].

As to cattle, the wholeſomeneſs of this plant is beyond diſpute. *Florentin* (or *Florentius* as ſome call him) who writ a book on Planting, and another on Agriculture, about fifteen hundred years ago, recommends ſmall quantities of lucerne as a cure for ſick ſheep [p]; and *De Serres* preſcribes the ſame remedy

[m] DIOSCORID. *Matthiol.* lib. ii. c. 141. p. 384.

[n] B. Jonſon, in his *Sad Shepherd*, mentions the plant called *Sops in wine*.

[o] "L'on nomme (la *médica*) en quelques endroits (de la France) SOUPPES EN VIN" Whence came the *Engliſh*, *Sops in Wine*. *Liebault*, *Maiſon Ruſtique*, 1617, 4to, lib. iv. 479.

[p] In *Geoponic*.

See alſo SURFLET's *Country-farm*. Second and Third Editions, reviſed by *Gervaſe Markham*. Folio, *London*, p. 495.

remedy to all cattle that are ill, languſhing, or out of plight [e].

Nevertheleſs, however wholeſome lucerne may be to theſe animals, when they are ſick and weak, yet ſtill it was matter of pure ignorance in ſome old *Engliſh* writers on huſbandry and botany to ſay is was called *mēdica a mĕdendo*; for, had theſe gentlemen known the ſcanſion of a *Latin* verſe, they might have ſeen that *Virgil* writes,

——*Medica putres*, &c.

And the *Greek* authors call it μηδικὴ, becauſe it came from *Media*, of which word the firſt ſyllable is long, as

Media fert triſtes ſuccos, &c. IDEM.

It is a great misfortune that the treatiſe is loſt which *Amphilochus* writ concerning the cultivation of *medica* and *cytiſus*, which book was compoſed as long ago as before the times of *Pliny* the elder.

SECT. II.

Lucerne Fields not to be grazed. Of Fences.

IT is no-ways adviſable to graze lucerne-fields, though ſome good *Engliſh* writers ſeem to allow the practice: For the crown of the root (which at length becomes a ſort of bulb) is ſo ſweet, that the cattle

T

[e] Τροφὴν δὲ παραβλητέον κύτισον καὶ μηδικήν. *Geopon.* lib. xviii. c. 2.

——— Dandum eſt lactariis medica & cytiſum. VARRO, Lib. ii. c. 1.

" Le bon meſnager fera tres bien de ſe pourvoir de quelques journaux (A *journal* is ſomething leſs than an *Engliſh* ſtatute-acre) de ceſte *exquiſe paſture*, pour en diſtribuer en hyver à ſes beſtes malades, laſſes, maigres, recreües, pleines à laict, pour aider

cattle will often bite it too close, and heavy large beasts may bruise it with their feet. Nor is this any new-fashioned fanciful opinion; for an experienced writer on husbandry, more than one hundred and fifty years ago, very much dissuades us from grazing lucerne [f]. Therefore, upon the whole, it seems best to cut it up mornings and evenings, and bring it (at least for horses) into the stable; by which means the same quantity will go thrice as far as if it was fed promiscuously and trampled by them.

On this account lucerne-plantations must be guarded from cattle with as much caution as *Virgil* wished to protect his vineyard, and for the same reasons, if not stronger ones [g]:

Texendæ

aider a remettre & fortifier les portiéres & servir à l'augmentation du laict des allaictantes: Aussi à ses poulains, veaux, agneaux, chevreux; par fois leur en donnant comme pour les regaillarder." *Theatr. d'Agricult.* Fol. 1600, 271."

" [f] En ceci (dit-il) ceste herbe differe d'avec les autres des prés communs, qu' elle ne veut estre *nullement mangée sur la terre*, ne foulée aux pieds par les bestes: Leur dents, souffle, & trepis contrarians à son naturel: Ains son propre ....., est d' estre fauchée rés de terre avec des faulx bien trancheantes." *Idem*, ibid.

[g] FITZ-HERBERT, the father of *English* husbandry, recommends fencing lands with equal earnestness. *Surveying*, p. 50. Lit. b.

Much has been said concerning this great man in the foregoing Essay.

His first work, in husbandry, is intitled, THE BOOK of HUSBANDRY; printed in *Italics*.

At the end of it are these words:

" Here endeth the right profitable book of husbandry, compiled some time by master *Fitz-Herbarde*, of charity and good zeal that he bare to the weal of this most noble realm: Which (work) he did not in his youth, but after he had exercised husbandry with great experience XL years."

Imprinted at *London*, in *Fleet-street*, in the house of *Thomas Berthelet*, near the *Conduit*, at the sign of *Lucrece (cum Privilegio)* 1534, small 8vo.

Of this work the author speaks as follows:

" As

Texendæ ſepes etiam, & pecus omne tenendum eſt:
Præcipuè dum frons tenera imprudenſque laborum;
Cui, ſuper indignas hyemes, ſolemque potentem,
Sylveſtres uri aſſidue, capreæque ſequaces
Illudunt: paſcuntur oves, avidæque juvencæ.
Frigora nec tantum cana concreta pruina,
Aut gravis incumbens ſcopulis arentibus æſtas,
Quantum illi nocuêre greges, durique venenum
Dentis, & admorſo ſignata in ſtirpe cicatrix.
GEORG. II. v. 371.

" As touching the points of huſbandry—I will not ſay it is the beſt way, and will ſerve beſt in all places: But I ſay it is the beſt way that ever I could prove by experience, the which have been an houſe-keeper 40 years and more; and have eſſayed many divers ways, and done my diligence to prove by experience which ſhould be the beſt way.——

——Rhet'rick in me doth not abound;
Wherefore I have ſown ſuch ſeeds as I found."
[*i. e.* managing an eſtate;

His ſecond work, in huſbandry, is intitled SURVEYING; or, as he calls it, in another place, *The Book of Surveying* and *Improvements*, ſmall 8vo, containing 120 pages, imprinted for *Berthelet*, 1539, in a black letter.

Fitz-Herbert was born at *Norbury* in *Derbyſhire*, and, if I miſtake not, is buried there. He was made judge of the Common-pleas in the 15th year of *Henry* VIII. How he could be a practitioner of the art of agriculture for 40 years, as he himſelf ſays in 1534, is pretty extraordinary. I ſuppoſe it was his country amuſement, in the periodical receſſes between the terms.

This treatiſe conſiſts of inſtructions to noblemen and gentlemen who manage their eſtates in perſon; and to land-ſtewards, bailiffs, *&c.* who act under them or in their ſtead. It ſets forth likewiſe the nature of tenants tenures, and the laws of court-baron, court-hundred, chartuaries, *&c.* being a ſort of commentary on an old ſtatute named *extenta manerii*.

In a word, one may pronounce juſtly, concerning each book of huſbandry which *Fitz-Herbert* has given us, what a modern writer obſerves of *Creſcenzio*'s *Agricoltura*, which was publiſhed 56 years before; *Eſt libro ſtimatiſſimo & ſa teſto dell' arte.* In ſhort,

Firm fences [b] muſt be made, and entrance barr'd
To cattle of all kinds, whilſt the young ſhoot
Is ſoft and green, unknowing rude deſpoil.

For

ſhort, *Fitz-Herbert*, like *Virgil*, ſeems to have written intirely from his own experience.

Thoſe who cannot procure theſe two books of *Fitz-Herbert*, (of which, probably, there are not twenty complete copies in the kingdom) may content themſelves with *S. B.'s Epitome of Huſbandry*, 12mo, 1669; which author, without making the leaſt acknowledgment, has tranſcribed from him 181 pages, almoſt verbatim.

It is pretty plain that the ingenious and diligent inquirer, *Samuel Hartlib*, had never heard or known of *Fitz-Herbert*'s works, though publiſhed a little more than a century before his time, as will appear from the following paſſage, where he laments that we have not a ſyſtem, or complete book, of all the parts of agriculture: "*Till the latter end of Queen* Eliſabeth's *days* (ſays he) *I ſuppoſe that there was ſcarce a book wrote of this ſubject: I never ſaw or heard of any.* About that time *Tuſſer* made his verſes, and *Scot* wrote about an hop-garden. *Googe* tranſlated ſome things Lately divers ſmall treatiſes have been made by divers, as Sir *H. Platt*, *Gabriel Plattes*, *Markham*, *Blythe*, and *Butler*, who do well in divers things; but their books cannot be called complete books, as you may perceive by ſundry particular things not ſo much as mentioned by them. The *Country Farmer*, tranſlated out of *French*, is enough, if not more than enough; but it is no ways framed for us here in *England*: And I fear the firſt authors went on probabilities and hearſays, rather than experience. I hope ſome ingenious man will be encouraged to undertake a work ſo neceſſary and commendable." *Legacy*, p. 105, 4to, 1651.

[b] "The fence, here mentioned by *Virgil*, is ſuppoſed not to have been a green hedge, but poſts or ſtrong ſtakes interlaced with dry wood." MARTYN's *Georg.* p. 217, 8vo.

But *Columella*, ſeemingly with greater judgment, declares himſelf of another opinion, and ſays, "That the moſt antient writers on huſbandry preferred the *live-hedge* before the *ſtructile* one, as more laſting and leſs expenſive." *Vetuſtiſſimi auctores vivam ſepem ſtructili prætulerunt, quia non ſolum minorem impenſam deſideraret, verumetiam diuturnior immenſis temporibus permaneret. De Re. Ruſt.* Lib. xi. c. 3.

Quick-ſet hedges are of great antiquity. It appears from *Homer*, that, when *Ulyſſes* returned to his father *Laertes*, the good old man had ſent his ſervants to take up young thorns, and was occupied in preparing ground to receive them for the purpoſes

above-

For (not to mention winter's piercing blaſt,
Or ſummer raging with ſolſticial heat,)
Dread thou the ſavage buſle, which inſults
Thy rampart's ſtrength, and burſts a breach by
ſtorm;
The goat, who wantonly muſt all things taſte,
Succeeds,——with nibbling ſheep and hungry
ſteers.
Theſe hurt thee more, than all the rage of froſt,
Or the ſun's ſtroke that ſplits the vineyard-rocks:
Their bite a poiſon, and their wound a ſcar
Indelible, unſeemly.——

Columella is as careful under this article as *Virgil*, for he will not allow large cattle to enter a meadow of common graſs, till the third year after ſowing. [c]

T 3 SECT.

above-mentioned. *Odyſſey*, Lib. xxiv. This ſort of fence is called, by *Varro*, *tutela naturalis & viva*.

DIOPHANES, who flouriſhed about the time of *Cicero*, and abridged the voluminous huſbandry-writings of *Mago* the *Carthaginian*, has left us further directions about ſuch hedges, in the GEOPONICS. Lib. v. c. 44.

[c] Impetus aquarum proluit terram, nudatiſque radicibus gramina non patitur coaleſcere, propter quod nec *pecora* oportet teneris adhuc & ſubſidentibus pratis immittere, ſed quoties herba profiluerit falcibus deſecare. Nam pecudes molli ſolo infigunt ungulas, atque interruptas non ſinunt herbarum radices ſerpere & condenſare. *Altero* tamen anno minora pecora poſt fœniſicia permittemus admitti, ſi modo ſiccitas & conditio loci patietur. *Tertio* deinde, cum pratum ſolidius ac durius erit, poterit etiam majores recipere pecudes. *De Re Ruſt.* lib. ii. c. 18. p. 76.

In another part of this work, namely, in the Poem on Gardening, he obſerves as follows;

Talis humus, vel parietibus, vel ſepibus hirtis
Claudatur, neu ſit pecori, neu per via furi.

COLUMELLA flouriſhed under the Emperor *Claudius*, about fifty years after the death of our Saviour, and lived in *Spain*, in the province of *Bætica*. His xth book, which was intended as a ſupplement to *Virgil*'s Georgics, has its merit. All good bailiffs and land-ſtewards were called from him *Columella's*; witneſs the following inſcription on an antient marble:

Servæ

SECT. III.

The Management of Lucerne-nurſeries; and of Burn-beating.

SOW lucerne-ſeeds carefully in the nurſery, in ſuch a manner as turnep-ſeeds are ſown, taking care that the ground be finely dug and picked.

If the weather be dry and the wind harſh, as often happens in the beginning of *April* (the common time of ſowing) remember, after the ſeeds are neatly raked in, and thinly covered, to make uſe of the watering-pot very ſparingly, keeping the roſe on, and juſt moiſtening the ſurface of the ground. Since making this remark, I find the ſame precaution recommended by that experienced practical husbandman *Agoſtino Gallo* [d]; who continues to obſerve (perhaps with greater juſtice in regard to *Italy* than *England*) "that it is beſt in *dry* weather to ſow lucerne-ſeeds about half an hour before ſun-ſet, becauſe the falling dews will diſpoſe them for vegetation; whereas, in dry hot ground, the ſeeds will be rumpled, parched, and cracked." [e]

This being done, preſerve the ſpot intirely free from weeds, as ſoon as ever the plants are high enough to be well known and diſtinguiſhed: [f] But, when they come to an height of five inches, thin them with a tranſplanting trowel, where they ſtand too thick, and prick them into the vacant ſpaces, or into

Servus neque infidus domino, neque inutilis cuiquam
Lucii Columella hic ſitus Metrophanes.

"Here lies *Metrophanes*, the *Columella* of *Lucilius*: Faithful to his maſter, and unuſeful to no man."

[d] *Vinti Giornate dell' Agricoltura*, 4to, 1569, p. 35, 36.

[e] Ibid *Giorn. 2da.* [The author *Agoſtino* GALLO was a nobleman of *Breſcia.*]

[f] See two prints of young lucerne, one plant a *week* old, and the other *five* weeks old, SECT. XXVI.

into the beds freſhly prepared to receive them: Taking the advantage of a moiſt drizzling day.

I have known ſixteen perches of nurſery afford ſets or plants ſufficient to fill an acre, at proper diſtances; but then the previous management was very exact and ſkilful. It is more prudent (conſidering the generality of cultivators) to allot thirty perches for ſuch a ſeminary, and four ounces of ſeed, at leaſt, to every perch. M. *du Hamel* adviſes more; [e] and perhaps great allowances ought to be made for caſual drowth, black ſharp winds and other accidents; particularly the attacks of the turnep-fly, and the ravages of ſmall birds.

And here, if people have no objection to a little more expence, it would be certainly beſt to order the plantation-field to be as well dug [f] as the nurſery, and picked clean from weeds, roots, ſtones, *&c.* which may coſt about two pounds an acre once for all. Of courſe, the additional expence will be near one pound greater than ploughing and harrowing; yet will repay the owner doubly and trebly, and muſt facilitate all ſubſequent hand-hoeings and horſe-hoeings. Beſides, it is almoſt impoſſible to plough one or two acres clean; for half ſuch a little plat will be waſte-ground and head-lands near the hedges.

And that digging is greatly ſuperior to ploughing will appear from reading a treatiſe written by

[e] *Elemens d'Agricult.* Tom. ii. p. 126. 1762, *à Par.*

[f] *Memoires* du Marq. de TOURBILLI, *ſur les Defrichemens*, p. 291.

Τὸ φυτευθησόμενον χωρίον ἀπὸ πάσης ὕλης καθαρτέον, ἢ σκάπτοντας μόνον, ἀλλὰ καὶ ἀρότροις νεώλας πολλάκις· ἢ τὰς ῥίζας μόνον ἐξαιρεῖντας. ἀλλὰ καὶ τὰς λίθους ἐκφορεῖντας· καὶ μάλιστα τὰς μείζους . . . . . Τὴν δὲ γῆν σκάπτεσθαι δεῖ ἕτως, ὡς τὴν ἄνω ἔσαν εἰς βάθος χωρεῖν, καὶ τὴν κάτωθεν ἄνω φέρεσθαι. GEOPONIC. Lib. v. c. 19.

VARRO ſeems to be the firſt huſbandry-writer who comprehended the reaſon why hoeings and diggings gave new life to plants, and in one inſtance moſt particularly: *Si* SICCITATES *ſint*, SARRITO.

Sir *Hugh Platt*, whom *Hartlib* calls [e] "the moſt curious man of his time." This pamphlet is intitled *Adam's Art revived*. *Wolridge* ſays, that *Gabriel Plattes* was the author of it. But this ſeems to be a miſtake. However, the *latter* concurs with the *former* in ſaying, "That one acre dug will produce as large a crop as four acres ploughed." [f]

What is here ſaid relateth only to ſmall undertakings, whoſe object is only one acre, or two at moſt. Thoſe who have inclination, fortune, or ſpirit, to venture farther, would do well to copy the method made uſe of by that excellent cultivator *Bellingham Boyle*, Eſq; who began his experiments of lucerne in the ſame year that I did, but proceeded upon a larger ſcale; for he undertook the culture of ſix acres at once.

His preparation of the field was as follows:

"In the year 1757, he gave his field a ſummer fallow, and having thoroughly ploughed and harrowed it (not as farmers underſtand theſe words, but effectually, inſtead of ſuperficially) he ſowed wheat, after the ground had been dreſſed with lime. In 1758, his crop of wheat was very great. Immediately after harveſt, he gave the land in queſtion a ſeverer diſcipline, uſing every method for pulverizing the earth and extirpating weeds, that the beſt husbandmen are acquainted with, either in our kingdoms or abroad: So that the field appeared again a perfect fallow. Then ploughing it very narrow and ſharp, he made water-thoroughs with the plough, and left it in this condition for the winter 1758.

"In ſpring 1759, he made many *French* drains in the field, as before he had made open ones for the winter; and, by ſtone-picking the land, had nearly ſtones ſufficient to fill them. In *March*, the ſame

[e] LEGACY, p. 88.

[f] *Diſcovery of infinite Treaſure*, 4to, 1656, p. 92.

ſame year (taking advantage of the firſt fine weather) he ſlit the ridges with the plough, and reduced the land to the fineſt tilth he was able, and tranſplanted the lucerne from his nurſery in autumn: In the whole proceſs of which, he followed *Du Hamel* exactly."

Nothing in huſbandry could be more ſenſible and maſterly than this preparation of a large piece of land for receiving lucerne.

As I am here ſpeaking profeſſedly of nurſery-plots, and fields ſet apart and prepared for tranſplantation, it may not be amiſs to give directions how to act in a certain caſe of difficulty, which may happen to preſent itſelf.

Thoſe who would throw an old paſturage into lucerne, inſtead of fields that have been long in tillage (which is a point more eaſily managed) muſt have recourſe to *burn-beating*, an old practice of huſbandry, in my opinion, originally *Engliſh*, but kept up in its full forms only in *Cornwall* and *Devonſhire*.

As I have been a conſtant witneſs of this operation for a number of years ſucceſſively, and remarked its defects and advantages with a careful eye, I may, perhaps, one time or other, deliver my ſentiments at large upon the whole proceſs; for the practice appears to me to be of great uninterrupted antiquity in the counties above-mentioned,[d] and more or leſs known and uſed all over *England*, till about the time of the reſtoration.

To perform this work, in order to prepare an old paſture-field for receiving lucerne, I muſt firſt make the reader acquainted with an inſtrument, called, in the weſt of *England*, a *beating-axe*,[e] of which I ſhall give a repreſentation cut in wood in this ſection.

With

[d] What the farmers at preſent, in moſt parts of *England*, call *burning the couch*, is an imperfect burn-beating.

[e] This ſhews that we ought, according to proper orthography,

With this *beating-axe*, when old paſturages are to be prepared for receiving lucerne, after the buſhes and brambles are neatly [b] grubbed, the turf is cut up in ſtrips about two feet three inches long, and ten or eleven inches broad. Theſe ſtrips are thicker or thinner, according to the foulneſs of the ſward; but the uſual thickneſs is three inches; for, if the inſtrument does not cut below the crown or head of the roots of weeds, ſuch roots will ſprout again, and the firſt labour become fruitleſs. The work-man, with the ſame tool he uſes in cutting theſe ſlices or ſtrips, ſets them up very dextrouſly, in a ſort of ſpiral pyramid or cone, not much unlike an high-crowned hat, but rather more obtuſe; in which poſition they dry ſpeedily and conveniently, the graſſy part ſtanding outermoſt.

The common expence of this labour (for I ſhall paſs by the whole proceſs, which is very minute) including the burning the turf and ſpreading the aſhes, in very coarſe graſſy ground choaked with weeds, comes to about one pound ſeven ſhillings an acre, and I have known above five hundred buſhels of aſhes procured from a ſingle acre.

This performance being finiſhed, and the aſhes ſpread, make uſe of a light plough, and plough the ground with a thin ſhallow ſtroke, cutting the lines formed by the burn-beaters at right angles. Harrow the traſh together, till little or no earth remains ſticking to it, and then burn it in ſmall heaps.

In ſuch graſs-fields as are broken up expreſly for receiving lucerne, begin the firſt operation in the former part of *May*, and let the ſecond burning take place before the end of *June*. Forty equidiſtant heaps (called by the *Swiſs* perpetual ovens, about two feet and an half diameter, with half a furze-

phy, to write *burn-beating*, and not *burn-bating*, *burn-baiting* and *burn-baking*, as many authors do.

[b] If the turf, in taking up theſe roots, be much broken and mangled, it will perplex the burn-beaters in their cutting.

furze-faggot placed near the bottom, and an air-hole fronting the wind) will answer the purpose better than two hundred small ones, according to the common practice.

These heaps, when once thoroughly lighted, may be fed, enlarged, and consumed at pleasure: Whereas in small heaps a great part of the outermost turfs will remain uncalcined.

The field thus prepared must be gently stirred with the plough, after the 2d burning and spreading; I say gently, because ashes have a great propensity to sink deep into the ground.——Afterwards, at leisure, give the field a winter's fallow, that the dry sharp force of the ashes may cool a little, and then prepare it duly for a spring transplantation. The marquis de *Tourbilli*'s famous treatise *sur le Defrichemens*, [f] is founded principally upon the art of burn-beating. He fancies the practice to be originally *French*; but it is inconteſtably certain that it has been constantly made use of in *Devonshire* and *Cornwall*, from times immemorial. Our writers speak distinctly concerning it in the beginning of the last century: Theirs are totally silent; even *De Serres*, with all his minuteness, in a vast folio, never mentions it in the year 1600.

I will speak a few words more upon this subject. —Tho' the manner of burn-beating may vary in several countries, as also the methods of collecting together the hurtful vegetables that ought to be burnt; and tho' different instruments may be made use of for scarifying the surface of the earth, as light common ploughs, finned, and three-coultered ploughs, paring-axes, *&c.* yet the practice in general seems to me to be almost as old as agriculture itself. *Virgil* advises it, [g] but describes not the opera-

[f] Published in 8vo, 1761.

[g] *Sæpe etiam steriles incendere profuit agros.*
and again,
Effœtos cinerem immundum jactare per agros.

operation, being at that time well known. The *Hurons* of *Canada* (the moſt ſenſible civilized nation on the continent of *North-America*) have never uſed any other ſort of manure; and the inhabitants of *Upper Hungary* have pared and burnt the foul turf from times immemorial.

But burn-beating, like all other good practices in huſbandry, may be abuſed, and in ſome caſes prove detrimental rather than uſeful, either by performing the operation improperly, or repeating it too frequently. But theſe exceptive caſes deſerve to be conſidered more at large. It may ſuffice here juſt to ſuggeſt the precaution.

Nor is there any reaſon to think that the inſtrument, made uſe of to pare the turf, is of *French* invention. To prove which, I will beg leave to lay before the reader a print of the *French ecobüe*, and refer myſelf to thoſe perſons who have chanced to take notice of our *Weſt-country beating-axe*. Nor will I diſpute the *national* credit of this invention, (except in a ludicrous manner) with ſuch an intelligent and ſkilful cultivator; but rather wiſh to ſay, in the language of the poet,

——*Solida eſt mihi gratia tecum.*
OVID. *Met.* xii.

Therefore the whole matter in queſtion (with the marquis's conſent as well as mine) may be left to the deciſion of ſome future *Pancirolli*.[c]

[c] An *Italian* who wrote an ingenious book *de Rebus inventis ac deperditis*.

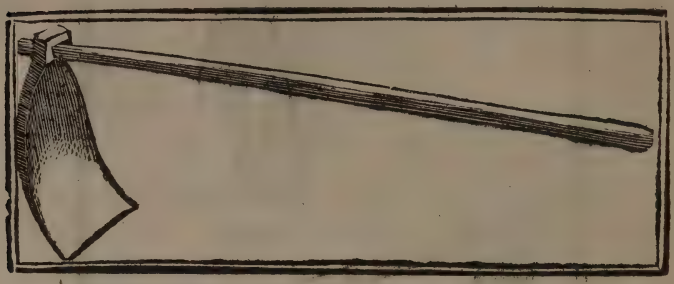
The

The FRENCH ECOBUE.

The *Engliſh* weſt-country *beating-axe* is preciſely the ſame with the *French* beating-axe here repreſented, if we except only one particular; which is, that the handle of the *Engliſh* inſtrument is ſomething longer, and conſequently more commodious.

If this beating-axe of the marquis *de Tourbilli* be not of true, original, *Engliſh* invention, it ſeems plain to me that we did not copy it from the *French*, but from the *Italians*, who had always a frequent intercourſe with the ſouth-weſt parts of our kingdom, in making voyages for tin; and of courſe might ſhew us the uſe of their inſtrument called *Zappeta*. For as agriculture revived with them ſome time before it made *any ſhew of conſiderable appearance with us*; (now by the way we were half a century before the *French:*) And as drawings and prints were publiſhed of moſt huſbandry implements then uſed in *Italy*, it is probable that ſuch improvements made no ſmall noiſe in *Europe*, and many things were copied from theſe diſcoveries. The

The *Italian* ZAPPETA: Being a *paring* or *beating-axe* uſed in the year 1569.



What makes me more inclined to think, as I now do, is that the *Devonſhire* and *Corniſh* ſpade is formed exactly upon the model of the *Italian bailli* (a ſpade made uſe of in ſtony mountainous countries;) of which I will here give a ſlight ſketch, omitting the handle, which is about four feet ſix inches long, without croſs-bar, or ear at top, as the common garden-ſpade has.

The *Italian* BAILLI, or *field-ſpade*, of the ſame antiquity.

Whoever

Whoever remembers the *Devonſhire* or *Corniſh* ſpade, will ſee at one glance that the bailli and *that* are the ſame thing.

The eaſt-country huſbandman holds the weſt-country-ſpade in deriſion very unjuſtly; for, tho' it is of little uſe in gardening, as it turns up a cone of earth inſtead of a cube, yet no inſtrument of the ſort works ſo expeditiouſly and eaſily in a ſtony country.

The nature of its point facilitates entrance, and the length of its handle, in diſlodging and unheaving a large ſtone, ſupplies the place of a leaver.

I ſhall conclude this ſection, ſo far as it relates to lucerne-nurſeries, with obſerving, that, if the nurſery be made ſomewhat larger than I have recommended, the ſupernumerary plants may be reſerved till another year or two, with no ſmall advantage to the owner.

Thoſe perſons, therefore, who make a large plantation of lucerne, would do well (if they have a quantity of roots in the nurſery ſufficient for free chuſing and rejecting at the time of tranſplanting) to remove only the larger, well-coloured, vigorous plants, and leave the ſmall and more weakly ones in the nurſery, which, in another year, will make excellent roots for ſupplying ſome vacant places in the tranſplanted field; for forty or fifty plants out of a thouſand may be ſuppoſed to die every year. Theſe ſeemingly contemptible roots, left in the nurſery, will make a fine appearance in the ſecond year. They will procure free ſpace and nouriſhment by the removal of their neighbours; and the ground will be looſened and ſtirred round them in taking up the better roots.

Theſe nurſery-plants may be taken up, clipped, and removed into the field, as before directed, till the beginning of autumn in the third year of their growth, after which (another ſmall nurſery being

being made for repleniſhing vacancies in the great plantation) they muſt remain undiſturbed in the place where they were firſt ſown, and be cut occaſionally for green fodder. But, perhaps, I may ſuggeſt here a better expedient, confirmed by frequent trials: Which is, that if, at the firſt time of tranſplanting, the cultivator ſhould find a conſiderable number of *ſmall roots* in his nurſery, and yet be deſirous to *fill the whole piece of ground* ſet apart for receiving the tranſplanted roots, *I would then adviſe him not to cut the tap-roots of the ſmall plants at all, but remove them into the new ground in their natural ſtate, ſhortening the herbage only:* And ſuch ſmall plants, thus managed, will proſper extremely well.

My reaſon for giving this advice is, *that, if you amputate the tap-root in a ſmall plant, then a ſufficient length of root will not be left to anſwer our purpoſes; and, as thenceforward* the root in queſtion will *ſhoot no more downwards*, the reſult will be, that it will never attain a ſufficient depth of ground, and conſequently may be eaſily diſlodged in hoe-ploughings, and injudicious cutting, when the operator, making uſe of a reap-hook, graſps the herbage of the whole plant in his left-hand, and pulls a little upwards with it, at the ſame time that he is cutting with the right.

SECT. IV.

Times of ſowing Lucerne; Times and Manner of tranſplanting it.

THE general times of ſowing and tranſplanting lucerne have been limited hitherto to the beginning of *April*, and the firſt or ſecond weeks in *Auguſt:* But this is tying ourſelves down to a *couple of fortnights in each year.* I have therefore made ſeveral experiments, in order to try whether it be not poſſible to obtain a little more time for performing the

the operations abovementioned: For few people like to be fettered down ſo very ſtrictly.

And here, perhaps, the cultivator may not be diſpleaſed, if I inform him that he may ſafely venture in caſe of urgency (or if he happens only to be impatient, though *April* is, upon the whole, the moſt proper natural time) to ſow lucerne-ſeeds in *May*, *June* (and, perhaps, the beginning of *July*) in warm moiſt weather: Cutting the ſtalks of the plants on the approach of winter, and leaving the roots undiſturbed in the nurſery, till the new appointed time of removing them comes (which cannot be the *Auguſt* of the ſame year) but in the *April* of the year enſuing. Such plants, though their ſeeds are ſown in *May*, or *June* particularly, will have little to fear from the ſeverity of the ſucceeding winter: For the roots will have acquired ſtrength and vigour enough to contend with it. Thus *one half-year* will be gained in raiſing a crop, and people will have their choice of *two* ſeaſons for tranſplantation inſtead of *one*; which may be looked upon as ſome advantage.

Experiments of this kind have been made by me at all the times abovementioned. As to ſowing lucerne in the end of *April*, the whole month of *May*, and till the middle of *June*, I never found the leaſt appearance of danger. It may ſuffice, therefore, juſt to relate one experiment that was made ſomething later in the year. I mention it only as an attempt of curioſity, without propoſing to recommend it for a general practice in huſbandry, there being full choice of time allowed by me, without poſtponing matters to a ſeaſon where there is the leaſt appearance of danger.

On the 26th of *June*, 1758, I ſowed a plat of ground, with lucerne, in a wet warm ſeaſon. By the 8th or 9th of *October*, the plants were ſome of ten inches high. They paſſed through all the ſeverity

of winter, were tranſplanted at ſpring, and cut twice or thrice during the ſummer.

Thus have I allowed a couple of different periods for tranſplanting; namely, *April* as well as *Auguſt*; inſtead of *Auguſt* only. As to the time of ſowing, I have extended it from three weeks to near a quarter of a year; and, if I here differ, in any degree, from M. *de Chateauvieux*'s excellent inſtructions, I do it with as much deference as if he were actually ſuperviſing what I am now writing.

It it true ſome cultivators, in the ſouthermoſt parts of *France*, have ventured to ſow lucerne in *Auguſt*; ſometimes with tolerable ſucceſs, but very rarely. Therefore, upon the whole, ſuch a practice in husbandry is hardly worth copying, even in a warm climate; and an imitation of it, in *England*, might be looked upon as a raſh undertaking.

I have dwelt longer upon this article, as many perſons may not have patience to poſtpone their attempts in agriculture to another year: Others again may ſow their nurſeries in *April*, without being at leiſure for autumnal tranſplanting; or the field, ſet apart for receiving the roots, may not be thoroughly prepared, or the crop removed. A third claſs of men may like to raiſe large plantations *very ſoon*: And therefore, upon each of theſe accounts, we have given as much latitude in tranſplanting, and pointed out as many ſeaſons of ſowing, as could be diſcovered from ſuch experiments as we had the power of making for ſix years ſucceſſively.

Nevertheleſs, ſuch as chuſe to follow M. *de Chateauvieux*'s directions for tranſplanting (which probably are the beſt of any, where we have free choice of time, and are not too impatient) may, about the 10th of *Auguſt* (chuſing a moiſt ſeaſon, or elſe waiting a little longer) take up their plants, from the nurſery, with a ſharp ſpade; but then, at the ſame time, they muſt remember to take up no more roots

LUCERNE

W. Hibbart ad vivam del. & sculp.

than can be tranſplanted conveniently before night. As to the manner of clipping the ſtalks, and pruning the roots, enough has been ſaid concerning it in the beginning *of this Eſſay*; but the eye will better guide every perſon, who ſhall juſt conſider the annexed repreſentation, where he will ſee the manner of clipping and pruning lucerne, the plants being five months old, the ſtalks fourteen, fifteen, or eighteen inches high, and the roots meaſuring about twelve inches in length.

In the print here given, the white ſpots direct you to the places where the ſtalks and tap-root are to be clipped, or cut off with ſtrong ſharp ſciſſars. The lateral fibres alſo are to be ſhortened a little, and that with diſcretion: And if the tap-root (which is ſometimes the caſe) divides itſelf into two or more large forked branches (a circumſtance we thought needleſs to repreſent in the print) it may then be proper to apply the ſciſſars below the forked part, that each branch may puſh forth new ſhoots, and, conſequently, draw greater nouriſhment.

The ſpecies of lucerne here treated of, as chiefly cultivated for huſbandry uſes, *is the larger upright* MEDICA *with purpliſh or violet flowers.*

It may be needleſs to ſay any thing concerning the ſhape, aſpect, and manner of growing of this plant, ſince every ſuch circumſtance is better repreſented by a drawing, than deſcribed in words. Let it ſuffice, therefore, to obſerve, that this plant generally keeps an erect poſture, and ſeldom droops but for an hour or two, from *April* towards *Michaelmas*, either in rains or drowth, except the root be injured by ſome accidental cauſe,[f] ariſing often from ſome neglect in its management, which a ſkilful cultivator will diſcover in a few minutes.

The preſent drawing was made according to the traditional accounts they have at *Venice*, concern-

[f] See SECTION XXVI.

ing the manner *Matthioli*'s famous cutter on wood, made use of in designing plants from life: Whereas, in common herbals and books of agriculture, the drawings are usually copied from plants that are taken up and withering, or from branches preserved and gummed on paper. But no artist can spread a plant as nature spreads it when growing; and all the elasticity of the stems and leaves will be lost, as well as the true shape and distances one from another. And hence it happens, that the picture of the *dead* may not be able to recal the memory of the *living*.——Induced by these motives, the ingenious M. *du Hamel* (though *France* abounds with neat copper-plate engravers) thought it worth while to procure, from *Venice*, the wooden prints [b] in the *Valgrisi*-edition of *Matthioli*'s Commentary,

[b] It were to be wished, that the art of cutting on wood were *revived* amongst us, and, more particularly, in the present case, as it comes nearer to the true representation of plants, than any engraving on copper, though performed by the neatest hand. For there is a force and fulness in figures cut on wood, which the fainter delicacy of the burin can never attain to.

As a proof of this, whoever contemplates a plant rightly, cut on wood, will remember its figure longer, than *that* of the same plant engraven *on* copper, and know it more easily, when he sees it in the fields. And, in confirmation of this assertion, I appeal to the Herbal of *Durante* (excluding the edition, at *Venice*, of 1667, and meaning only the *Roman* editions in the century preceding) and the prints, cut on wood, in the first *Valgrisi*-edition of *Matthioli*'s *Dioscorides*, printed at *Venice*, folio, 1559. Concerning which, it may be observed, that they almost equal the exactness, sharpness, boldness, and firmness of *Marc-Antonio*'s gravings, being finished in the age of fine drawing and good workmanship. To which we may add, that prints, cut on wood, are intermixed most easily and conveniently with the letter-press; a doubly greater number of copies may be worked off; the lines retouched with greater firmness; and the engraving restored with less pains and more correctness.

This art arrived to tolerable perfection amongst us, in the latter part of Queen *Elisabeth*'s reign; and was carried on successfully, by *Switzer*, father and son, through the reigns of *James* I. and the two *Charles*'s; but expired in effect with the engraver

mentary, though they were 200 years old, and many thouſand copies had been drawn off from them.

Again, if the roots differ in ſhape from that which is repreſented in the print, then the pruning of them muſt be varied: In which caſe we can only give one general direction, which is to cut the tap-root below the forks; which forks (I believe) are occaſioned by ſome obſtruction from hard knobs of earth, or ſtones, which hinder the pivot or point of the tap-root from deſcending in its natural perpendicular courſe.

I have ſometimes ſeen a lucerne-root with five or ſix irregular ſpurs, occaſioned (as I ſuppoſe) by ſome obſtructions in the ground.

Roots of ſuch kind muſt be pruned with diſcretion, and, if it can be diſtinguiſhed that any one of the roots is the tap-root, cut it not at all, but prune the others.

I have nothing farther to obſerve, under this part of the preſent ſection, except that, in the print above exhibited, the undermoſt dotted marks, in the root, are not placed quite low enough below the crown of the root: Permit me, therefore, to obſerve, by way of caution, that if the root be ſufficiently long (and ſometimes I have known a lucerne-root, like *Virgil*'s oak, equal in length to the length of the branches) then leave it nine or ten inches long, after you have cut off the lowermoſt part of it.

ver of the wooden cuts in *Croxall's Æſop*: Of which, the firſt impreſſion is now held in good eſteem at *Rome*, and has gained admiſſion into ſome curious collections of prints there.—In the preſent declining condition of this art, we can only make uſe of it to repreſent little ſketches which deſerve not the expence and labour of copper-plate engraving.

Since writing this, the *ſociety for encouraging arts, &c.* has appointed a public premium for reviving a manner of engraving admired by *Raphael*, and executed ſo perfectly by his *Marc-Antonio*.

We have already mentioned the throwing the pruned plants into water; upon which article, an ingenious friend has obſerved, "that, if the roots remain any time therein, they will imbibe ſo much moiſture as will be greatly prejudicial to them." I apprehend, ſays he, "that to water them, after they are planted out, with a watering-pot, will both refreſh the plants, and ſettle the earth about their roots."

This muſt be acknowledged to be a prudent method, and moſt agreeable to the practice of gardening; but as M. *de Chateauvieux* does not adviſe it, and as plants are found to ſucceed very well without it, we were fearful of giving beginners too much trouble; but have carefully recommended a warm, moiſt, gloomy ſeaſon for tranſplanting, and allowed the roots to remain in water but a ſhort ſpace. Yet ſtill the watering-pot may be uſed to advantage in a dry ſeaſon, if people chuſe to give themſelves ſo much trouble.

Some precautions of this kind ought to be uſed, for it appears, by experience, that theſe plants, when dug from the nurſery, droop in an hour, tho' removed into the ſhade, except they are ſteeped in a veſſel of water.——In the next place, when you tranſplant the roots, ſqueeze them down moderately firm, and bring the earth up with your hands, till the ſhanks of the ſtalks are partly covered. But to this paſſage the ſame excellent judge in gardening has made an objection; to which our anſwer is, that he is certainly in the right with regard to ſpring-tranſplantations, ſuch as we have recommended, and partly experienced: But in reſpect to M. *de Chateauvieux*'s practice of tranſplanting in *Auguſt* (the point now under conſideration) I believe the remark will be found unneceſſary; for the autumnal heavy rains will partly waſh the light new-earthed-up mold down to its due level, and the froſts afterwards

wards will heave many plants upwards, ſo that, about *Chriſtmas*, the crowns of the lucerne-roots, thus managed, will ſtand juſt as far above ground, at winter, as the beſt cultivator would wiſh to find them.

When the plants are removed from the nurſery, ſome healthy roots may penetrate deeper into the earth than I have mentioned. Such roots muſt be taken up with double care, eſpecially if the ground be of a clayey or marly caſt. Even in other caſes you muſt direct the labourers to take them up with attention and patience, expreſsly ordering them to apply the ſpade [b] to a *certain* depth, and looſen the earth at bottom as much as may be. Nor muſt you break the lowermoſt fibres of the roots, more than you can poſſibly avoid; nor ſqueeze the ſtem and crown of the plant, when you draw it.

Nothing more needs be added under this article, except that the intervals ſhould be hand-hoed and hand-weeded after every cutting, till the aſſiſtance of the horſe-hoe can be called in, and then theſe kinds of labour will be conſiderably diminiſhed.

SECT. V.

The Expence of cultivating Lucerne.

AFTER all that can be ſaid, many people may object that nurſeries and tranſplantations are expenſive and troubleſome: But theſe circumſtances, it is to be hoped, will deter few gentlemen of ſpirit and fortune; for the long continuance of lucerne makes ample amends for a little uncommon diligence, and the firſt charges may be leſſened conſiderably, when the culture of this plant falls into the management of better hands than mine.

[b] A particular ſpade for this purpoſe is deſcribed and recommended in a note to SECT. VI, p. 102.

We all know that the farmer expends much money and gains very little from a crop of wheat at the expiration of his twelve months: But if we take ten years together, and compare the profits of lucerne on the one hand, and wheat, barley, oats, and clover on the other, the balance will certainly turn in favour of the lucerne-crops, and that in a proportion of three, or two to one at leaſt.

The expence of raiſing an acre of lucerne in the manner which we recommend (and ſuppoſing even digging to be made uſe of inſtead of ploughing) amounts, as nearly as I can remember, to the following ſums:

	l.	*s.*	*d.*
Fine-digging and picking 30 perches for a nurſery [b]	0	12	0
Seed	0	7	0
Hand-weeding the nurſery twice, and tranſplanting into vacant patches ſuch plants as ſtand too thick	0	13	0
Digging an acre for receiving the roots	2	10	0
Tranſplanting	1	5	0
Hand-weeding and hand-hoeing the rows, with a four inch-hoe that cuts downwards, and then with a larger plantation-hoe, which cuts horizontally	1	0	0
Two horſe-hoeings	0	5	0
Total	6	12	0

It is true, the expences of raiſing lucerne, in this manner, will vary, when applied to parts of *England* different from thoſe where the experiment was made, as

[b] For fear of accidents, it might not be amiſs to ſet apart a quarter of an acre for a nurſery. An over-plus ſtock of plants will inable the owner to paſs by the weaker ones, and leave them to remain for another occaſion. I ſubjoin this caution, as I have before mentioned only 30 perches: And thus every cultivator may follow his own judgment.

as the price of labour may be dearer, and rents run higher: But then the ground ought to prove better, which will balance the difference.

This plantation of lucerne may be cut three times, [f] the firſt year after tranſplanting, as ſome repayment for the out going expences: Next year the profit will be more conſiderable.

On the other hand, thoſe who prefer the drill-method of raiſing lucerne, as leſs expenſive, may ſeem to ſave about two pounds, or more, upon an acre, at the firſt appearance of things; but then the rows, in caſe the crop ſucceeds (which is a doubtful point) muſt be thinned, with good judgment, which will coſt money: And the vacancies in them muſt be filled at laſt with tranſplanted roots. Nay M. *de Chateauvieux* aſſerts, that *drilled* lucerne will rarely be ſo large and flouriſhing as the *tranſplanted* for the effects of horſe-hoeing, and the influence of manures may prove of leſs ſervice to the roots of the *former*, at a depth of 12 or 13 feet, than to the roots of the *latter*, whoſe fineſt imperceptible fibres will hardly deſcend above a yard perpendicular.

Beſides all this, the cultivators of lucerne are deſired to bear in memory what has been remarked in the 27th and 28th pages of this Eſſay, where it is ſuggeſted to them, that they may place the tranſplanted roots the firſt year at a diſtance of ſix inches aſunder from one another in the rows, and remove every other plant, the ſpring following, into a freſh acre of ground well prepared to receive them; by which means *one third* of the expence, in our laſt computation, will be taken away;—they will ſave themſelves the trouble of a ſecond nurſery;—gain a year in point of time;—and two acres of lucerne inſtead of one.

But

[f] I endeavour, upon this occaſion, to ſpeak with moderation. I have known a plantation of lucerne cut 6 times, the year after tranſplantation.

But here it must be observed, that, as in this latter case, 26,000 sets must be raised instead of 13,000, it will be necessary to allot more ground for a nursery, and sow a larger quantity of seed; allowing always (which I think sufficient) four ounces to a statute perch, though M. *du Hamel* allows six ounces to a *French* perch; but then the reader must remember, that a *French* perch is larger than ours, and that, at least, by one 5th. I thought it unfair to suppress this circumstance; so that *English* cultivators (if they please) may sow five ounces to each statute perch of nursery.

It is hard to say, at what precise time the assistance of the hoe-plough should be called in: But the owner of the plantation may venture on the attempt, I think, with safety, in three days after the second cutting, about the beginning of *June*; [g] for the roots then will be tolerably well settled in the ground, and before that time the flat plantation-hoe may be used, chusing such an one as is about eight inches and an half wide in the cutting part.

SECT. VI.

Of Hoe-ploughing, and other Methods of keeping the Plantation clean.

AS continued hand-hoeings will be chargeable, troublesome, and almost endless (being, in truth, little more than a temporary expedient, and slight scratching the surface of the earth) remember to make a light plough with which you are to cultivate the spaces between the rows; and in this case you may either invent a plough according to your own fancy, or copy such as are used at home, or in other countries, on the like occasion.

The

[g] This relates to lucerne transplanted in *August*.

The ſhare of this plough ſhould be ſharp, about ſixteen inches long, with a coulter proportionable: The plough itſelf no heavier than a ſtrong lad of 15 years of age can carry. And thus one horſe, after ſome obſtructions of no great conſequence in the firſt attempt, will afterwards draw it with eaſe. Yet ſtill the trouble will be leſſened, if the field be prepared by digging and picking up the roots and ſtones, inſtead of common ploughing, juſt before the ground is to receive the tranſplanted roots. Therefore, after a full ſecond conſideration, the *former* practice is recommended preferably to the *latter:* And, if the lucerne ſtands nine or ten years, the difference of the expence will not be perceived.

As the rows will be one yard four inches aſunder, there will be room ſufficient to guide the plough ſafely along the intervals, and yet no room to ſpare. It behoves the ploughman therefore to be extremely careful in the ſlice he cuts next the lines; ſuch a ſtroke muſt be a ſhallow and a dextrous one, nor muſt he approach too nearly. A man, an horſe, and a boy to lead the horſe will manage an acre in a day when they know their buſineſs: For it is more a matter of nicety than fatigue, ſince the ground ploughed in an acre will hardly exceed half an acre.

After the firſt time of uſing the horſe-hoe plough (which a man's own diſcretion upon conſidering the ſtrength of the plants will beſt determine) it may be laid down for a general rule, *that it will be always found moſt convenient to horſe-hoe the intervals (as long as the plantation ſtands) the third day after each cutting; for by that time the new ſhoots will make the plants viſible, nor will any ſide-branches ſtand in the plough's way.*

It may be proper alſo to hand-weed the lines once a year: And the larger weeds may be taken up expedi-

peditiously with the three-pronged ſpade, or the field-ſpade. [a]

Nor muſt we look upon this as any uncommon extraordinary trouble, for *Virgil* orders three or four ox-hoeings every year, even for the vineyard:

Eſt autem ille labor curandis vitibus alter
Cui nunquam exhauſti ſatis eſt, namque omne quotannis
Terque quaterque ſolum ſcindendum eſt, glebaque *verſis* [b]
Æternum frangenda *bidentibus*.———
Georg. II. v. 397.

———New labour is requir'd,
Nor muſt the painful huſbandman be tir'd:
For, thrice at leaſt in compaſs of a year,
Thy vineyard muſt employ the ſturdy ſteer
To turn the glebe; beſides the daily pain
To break the clods, and make the ſurface plain.
DRYDEN.

Again, we may obſerve, under this article of cultivating and keeping the intervals clean between the rows, that ſome perſons (at leaſt in ſmall plots of lucerne) may prefer the *breaſt-plough* to the *plantation-*

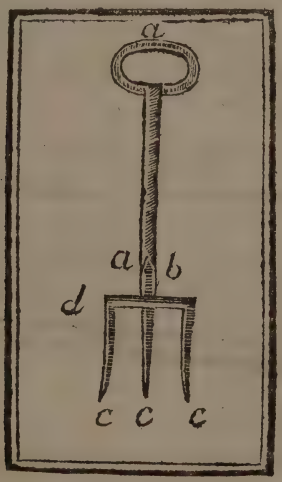
[a] The field-ſpade, for taking up weeds, ſhould be two inches and an half longer in the bit than the *London* garden-ſpade, and one inch and an half narrower between ſide and ſide, being, at the ſame time, well pointed with tempered ſteel.—This implement of huſbandry is chiefly uſed by foreigners in cleanſing fine graſs-fields once a year in *April*. When the weed is taken up with all its roots, a few graſs-ſeeds are ſprinkled on the ſpot where it grew: But this relates to common paſture-meadows.

[b] The teeth or tines of the antient *bident* were *curved* or *bent* downwards almoſt at right angles, as may be ſeen in an inſtrument of huſbandry, now uſed by farmers, called the *drag*: But *Lawſon's ſcrape-all* has the appearance of being a better invention.

tion-hoe, and of course may use the *former*, if the ground will admit.

Or else you may cause to be made a *trident* or *three-pronged spade*, formed from the handle to the iron-work, in every respect like the common garden-spade, as to length, strength, and substance. This instrument is managed like the ordinary spade, but performs its work with half the fatigue to the labourer, and consequently twice the business may be done in a day. It likewise lays surer hold of the roots of weeds, and cuts not asunder (as the garden-spade often does) the roots of valuable plants, which it is intended to assist and strengthen either in the hop-garden, lucerne-plantation, or the nursery of young trees. For these reasons it deserves well to be recommended, being in some instances superior to the common garden-spade, and always preferable to the breast-plough and plantation-hoe.

A THREE-PRONGED SPADE.



The letters *a a* represent the handle, one foot ten inches long; *b b* the socket, six inches in length;

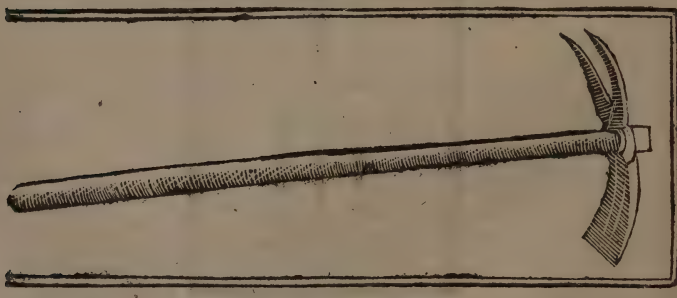
length ; *c c* the grains, and the iron they proceed from marked *d* ; their breadth at the uppermoſt part *d*, before they begin to diminiſh, being three-quarters of an inch.

Theſe grains turn a little upward, and not ſideways, which cannot be repreſented in the print.

Virgil, in the paſſage laſt cited, ſeems to have ſome idea of ſuch an inſtrument, but a *three-pronged ſpade* is far better than his of *two-prongs* ; and many have thought that four grains or prongs are preferable to three, but then one fourth more labour will be required : And, if the teeth are made ſufficiently ſtrong, it is probable that this utenſil will be too cumberſome.

The old *Italian* hoe, called *Zappetino*, will be found to be of incomparable uſe in a lucerne-plantation. It may be uſed ſafely between plant and plant in the lines, and work very near the roots with little or no injury to them ; anſwering at one and the ſame time the intent of an hoe, as well as of a bident or trident : But then it can only be uſed with advantage in neat elegant agriculture, where much circumſpection is required, as in nurſeries, lucerne-plantations, *&c.*

The ZAPPETINO.



But, if none of the inſtruments above-mentioned ſhould happen to content the reader, it may not be amiſs

amiſs to recommend a fourth inſtrument, (invented by *William Lawſon*, an eminent gardener and nurſery-man, about the year 1620, and called a SCRAPE-ALL) which proves extremely uſeful in gardens, nurſeries, hop-grounds, lucerne-plantations, and moſt looſe well-cultivated lands; but obſerve always, that the weeds muſt be raked off immediately after they are diſlodged and torn up, both in this inſtance and the former one: Or elſe, if the ſeaſon ſhould happen to prove moiſt, they will moſt of them take new root and ſpring again.

The following print is an exact repreſentation of the inſtrument here ſpoken of:

LAWSON'S SCRAPE-ALL.

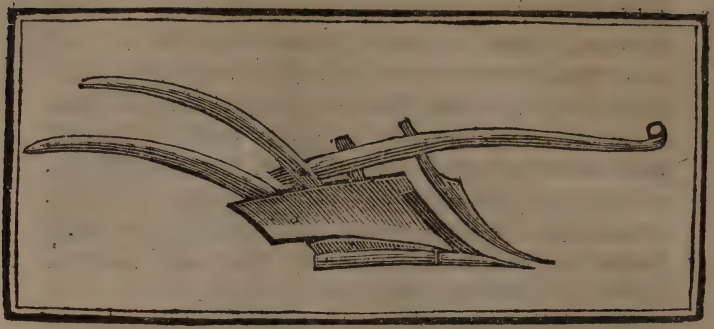
In this figure, *a* repreſents the head one foot long; *b* the teeth, eight inches long from the place where they branch out to their extreme point, and *c c* the handle, four feet eight inches in length.

As we are now profeſſedly treating of deſtroying weeds, keeping plants clean, and ſtirring the ground, it may not be amiſs to expreſs one's hopes of ſeeing ſome new-invented plough, cheap, ſimple, and rightly calculated for the occaſion: Particularly in a nation juſtly famous for ſkill in mechanics.

For my own part, I have contented myſelf hitherto with a plough of *Blythe*'s, altered ſo as to agree with the account given in the 101ſt and 102d pages of this Eſſay. It was no-ways intended by *Blythe* for the preſent purpoſe, as the practice of horſe-hoeing was then unknown.

BLYTHE'S

BLYTHE'S PLOUGH.



Many ploughs may be made of a more elegant ſhape and ſtructure, but this performs its work ſafely and ſteadily. Wheels, it is true, would render the draught lighter: But the ploughman then might cut in upon the rows, and make other miſtakes, as the plough may move with too much facility.

So that nothing more needs be ſaid concerning it, except that the idea of its conſtruction ſeems to be formed upon a right principle; and of courſe it may only be conſidered as a temporary ſuccedaneum, till ſkilful and ingenious perſons ſhall deviſe ſomething that is equally cheap, but more perfect. —Now, as moſt people prefer uſefulneſs and cheapneſs to elegant and expenſive inventions, it is natural to wiſh for an hoe-plough intirely ſimple and not coſtly: For the mechaniſm of thoſe deviſed hitherto by ingenious lovers of agriculture, is of ſo perplexed and complicated a nature, that it will no ways anſwer the common purpoſes of husbandry: But, being perpetually out of order, will throw the poor ploughman into deſpondence; and the rather as neither he nor the country plough-wright can comprehend how to rectify any defects or accidents, except with extreme difficulty.

As

As to other horſe-hoeing ploughs, there is *that* of *Tull* and the *cultivators* of Meſſieurs *du Hamel* and *de Chateauvieux*; but, if the reader be ſtill more curious, let him examine the deſcription of another ſort of cultivator or horſe-hoe plough, explained by ſix copper-plates, being the invention of *M. de la Levrie* in 1759 [a].

And here, as to ploughs of all ſorts, we join with *Hartlib* in obſerving, "That any ingenious perſon would do the honeſt and painful huſbandman very great pleaſure, who could facilitate the going of the plough, one of the moſt neceſſary inſtruments in the world [b]."

But all improvements are ſlowly propagated even from county to county. For example, the wheel-plough and folding of ſheep were known and commonly made uſe of in *England* two hundred and ſixty years ago, yet have not been able to travel through the kingdom to this preſent moment; which ſhews, that many good and valuable improvements have not (taking a century together) ſpread themſelves, at a fair average, more than about a mile a year.

We will now conſider the expences of an acre of lucerne the ſecond year, which will ſtand as follow:

	l.	*s.*	*d.*
Clearing the lucerne-plants from weeds in the rows by hand —— ——	0	8	0
One hand-hoeing of the intervals ——	0	8	0
Four horſe-hoe ploughings ——	0	11	0
Compoſt-dreſſing for manure, or ſoot, wood, or peat-aſhes, at an average *per* year —— —— ——	0	10	0
Diſperſing the manure —— ——	0	3	0
Total	2	0	0

[a] *Experiences ſur la Nouv. Cult.* tom. vi. p. 244, *&c.*
[b] *Legacy*, p. 5, 6.

Such will be the yearly charges, or in ſome proportion very like them, during the continuance of your lucerne, which I fix at a medium of ten years. *M. de Chateauvieux* ſays it may laſt twenty; and *Pliny* goes as far as thirty; though the expreſſion may be looked upon to be exaggerated [b].

SECT. VII.

The Author an Advocate for manuring Lucerne.

CONtrary to *Tull*'s *continued* practice, and *M. de Chateauvieux's firſt* practice, I declare myſelf an advocate for manuring lucerne; premiſing, in ſuch caſes, that all dreſſings are *relatively good, inefficacious*, or *hurtful*, according to the *nature of the ſoil* on which they are employed. Here alſo let it be obſerved, *That moſt ſoils have ſome one original predominant caſt, which may be maſtered for a time, but ſeldom or never conquered totally.*

In regard to manuring lucerne, it may ſuffice to ſuggeſt here in general terms, that, if the ground be ſtiff, cold, and of a clayey tendency, then wood-aſhes, ſoot, and lime are proper dreſſings. If the ground be hot, ſhallow, and braſhy, a compoſt of calcined clay, dung rotted to a fine mold, and pond-mud, long expoſed to ſun and froſts, and frequently turned, may have its uſe. And, if the ground proves of a middle nature, then malt-duſt will not be amiſs.—All theſe manures are eaſily procured; and therefore we have mentioned none that are ſcarce and dear. But as variations of ſoil are infinite, and few people know the true nature of any field (eſpecially if it be of the mixt kind) we recommend the *compoſt-dunghil* as the ſureſt and moſt univerſal aſſiſtant upon ſuch occaſions.

Many other manures may be good for lucerne; but dung probably is not one of the beſt, except

[b] *Hiſtor. Natural.* lib. xviii. c. 16.

cept it be very old [e], and well-corrected with proper mixtures of a ſweet, as well as fertilizing nature, ſufficiently warm and cheriſhing, but no-ways rank; for dung (eſpecially if it be new) produces in general very luxuriant, troubleſome weeds, inſects in abundance of various kinds [f], and gives the graſs a foul, cloying, putrified taſte.

The owner's eye, it is true, may be deceived, and his hopes encouraged by the largeneſs of the crop; but the ſagacious four-footed animals will diſtinguiſh better than we can pretend to diſtin-

 guiſh:

[e] Le fumier nouveau bruſle la ſemence de la luzerne, jetté ſur iceluy, avant qu' eſtre dompté par les temps.

Theatre d'Agricult. fol. 1600, p. 171.

Our countryman *Reginald Scot* declared himſelf much of the ſame opinion, upwards of twenty years before *De Serres* publiſhed his work. See the PLAT-FORM, *&c.* 4to, 1576, p. 37.

In dry, gravelly uplands, which are apt to burn, free uſe may be allowed of what the farmers call *ſpit-dung*, by which is meant dung that is turned and rotted, till it looks like black mold, being at leaſt two years old. G. PLATTES.

The *Norway* peaſant *dungs* his meadows *very ſlightly*, but has recourſe to ſand or aſhes.

Bp. of BERGHEN's *Nat. Hiſt. of Norway*, fol. p. 110.

More may be ſeen upon this ſubject in the *Curioſitéz de la Nature & de l'Art* by the Abbé *de* VALLEMONT, tom. ii. p. 75.

"Dung is never uſed properly for eſculent plants, till it be fully putrified, and turned into mold which has no rank, offenſive ſmell." G. PLATTES's XX *Experiments*, 1651.

The ſame author obſerves in another place, "That fattening the ground with rank dung does in ſome ſort adulterate plants, and *pejorate* [render worſe] their qualities: When contrariwiſe, raiſing the ſame plants in wholeſome natural earth doth meliorate their qualities."

[f] See the QUINTILII περὶ Κήπων in *Geopon.* lib. ii. p. 52, edit. *Needhami*.

In proof of what has been ſaid, horſes, for a year or two, will not taſte the graſs of a paſture-field that has been plentifully manured with the freſh riddance of privies. Nor will they eat oats the firſt year, that have been raiſed in an arable field thus manured. Something offenſive to them mixes with the juices of the plant. But, if ſuch dreſſings lie expoſed to the air two or three years in an heap, till they are reducible into powder, they are then very efficacious, and communicate no bad taſte, *&c.* to plants.

guiſh: And, if they could preſent a petition to their maſters, as the white heifers are reported once to have done to the emperor *Julian*, they would remonſtrate not a little againſt the immoderate uſe of this manure. Nevertheleſs, aſſertions like the preſent ought to be confirmed by ſome proof. An experiment therefore was made upon four acres of graſs-ground; of which *one half* was dreſſed with ſtable-dung, and the *other* with wood-aſhes kept dry. The *former* moiety appeared the moſt rich and luxuriant of the two; but the cattle always neglected it, till they had bitten the *latter* down to the bare earth.

M. de la Quintinie was of the ſame opinion with an anceſtor of *Columella*'s, who always oppoſed applying dung to the roots of vines. The *Frenchman* is full as peremptory as the old *Roman: Nul fumier*, dit-il, *pour les arbres: Je n' en veux point de tout* [c]. And his reaſon was, that, if the ſoil proves commonly good, there is ſtrength ſufficient in it to ſupport ſuch trees as we expect to bear fruits of an agreeable flavour. It has been obſerved, that a vineyard plentifully dunged produces abundance of grapes; but their taſte is no ways exquiſite: And therefore it is a common ſaying in wine countries, *Vive le vin d'un mauvais menager*; becauſe ſuch a man, neglecting the uſe of dung, or not being able to purchaſe it, produces but a ſmall quantity of wine, which, at the ſame time, is excellently well-taſted.

Thus ſweet parſley, the *celeri* of the *Italians*, is wholeſome and of a delicate taſte in dry, upland ground of moderate fertility; in grounds richly dunged, it is more rank and leſs wholeſome: But in wet grounds, ſupported by the mere force of dung, it has to a certain degree malignant qualities;

[c] VALLEMONT; *Curioſitéz de l' Art & de la Nature.*

ties; for it becomes acrid, unpalatable, and dangerous to be eaten.

Having thus given the reſult of my experience in regard to dung as a manure for lucerne, I ſhall ſubjoin only one ſhort caution; which is, that no dung, not even of the beſt kinds, muſt be ſpread on a lucerne-plantation, till it be two years old at leaſt.

In all grounds inclinable to moiſture, and ſuch particularly as are of a clayey caſt, it is pretty certain that the preference ought to be given to ſoot-dreſſings; and, after ſoot, to chimney-aſhes (thoſe of green wood eſpecially) provided they are houſed and ſecured from wet. Then ſoap-boilers aſhes may take place, coal-aſhes well-ſifted, charcoal-aſhes, and malt-duſt. Nor might the aſhes of lime be amiſs, nor lime itſelf, when mixed with ſuch fine mold as may be found under a ſhort ſweet turf in lanes or commons. The compoſt-dunghil alſo, as obſerved before, ſhould be applied to, which, at the end of twelve months, having been thrice turned, will ſpread almoſt as well as aſhes or ſoot. Nor will ſuch compoſt want ſtrength, when it is rightly managed: For if the dunghill be moiſtened at times with the brine, ſoap-ſuds, diſh-waſhing. and chamber-lie, *&c.* of the family, then, when it is removed into the fields, the ſharp, pungent, ſtrong ſalts, which fly off, will make the labourers ſneeze, and occaſion a ſmarting in their eyes.

When you manure lucerne with ſoot, dry-chimney-aſhes, lime, ſoap-boilers aſhes, *&c.* it is ſufficient to dreſs the *rows* only; becauſe theſe finer ſort of manures may be diſperſed in the niceſt exacteſt quantities, if ſown, in the *Berkſhire* manner, with a *peat-aſh ſpoon*. But if coarſer manures are to be employed in larger quantities, as old dung, marle, compoſt-dreſſings, *&c.* I would then adviſe the pro-

prietor of the field to manure *the intervals and rows promiſcuouſly.*

I have obſerved elſewhere, that the generality of cultivators manure lucerne once in two years; but, perhaps, it may be as well to refreſh it ſlightly and frequently at ſeaſonable junctures, whenever ſuch aſſiſtance appears to be neceſſary. Frequent repetitions will make amends for the ſmallneſs of quantity; ſeven or eight buſhels [f] of ſoot mixt with ſand, [g] or fifteen or ſixteen buſhels of wood-aſhes (kept dry) or malt-duſt, at each time, will be ſufficient for one acre, when ſown on the rows: Care being taken to perform this work in moiſt weather. Such a ſmall quantity of refreſhment appears, at firſt ſight, a mere trifle; but, being renewed occaſionally, will amount to ſomething in its effects. As to repeating the ſame dreſſings in *November* and *February*, [h] you muſt be left to your own diſcretion and careful obſervations, in proportion as you perceive that ſuch aſſiſtances may be wanted. And again, if you find ſoot, aſhes, *&c.* to prove a manure over-dry and over-warm for the ſummer-ſeaſon,

[f] Throughout theſe Eſſays, we mean, by *buſhels*, *Wincheſter-buſhels*, of 8 gallons; becauſe, in various parts of *England*, the buſhels are 9, 16, 18, and 24 gallons.

We deſire to be underſtood, with the ſame exactneſs, whenever mention is made of a *cart-load of manure*, which, according to the dung-cart uſed near *London*, is ſuppoſed to contain about 40 or 50 buſhels.

[g] The ſand is added, in order to ſpread or ſow the ſoot more equally. Sea-ſand anſwers the ſame purpoſe, and is alſo a manure. If the ſoot be old and caked, like the cinders of ore, it muſt be pulverized with a beetle.

[h] The two *Quintilii*, who writ on agriculture in the reign of the emperor *Commodus*, give directions to manure lucerne (τὴν μηδικὴν κοπρήσαι) in the month of *January*. Theſe writers, brothers, and both governors of provinces, were put to death by *Commodus*, about the year 186. They had no crime, except that of being rich, good, and knowing.

Epitomizer of Dion Caſſius.

ſon, reſerve them rather for winter-ſupplies, and have recourſe to the compoſt-dunghil.

Nothing can be more cheaply and eaſily managed, than manuring lucerne with foot-dreſſings: [1] For the labourer, if he makes uſe of a peat-aſh ſpoon and ſeed-lip, may ſprinkle the rows of an acre in four or five hours, walking down the firſt interval and returning by the ſecond, and ſo progreſſively.

Aſhes may be ſown in the ſame manner.

[1] PLATT's *Flora's Paradiſe*, Part I. p. 33, 34.

Sir HUGH PLATT (not to mention his other excellent talents) was the moſt ingenious huſbandman of the age he lived in: Yet ſo great was his modeſty that all his works ſeem to be poſthumous, except the *Paradiſe of Flora*, which appeared in the year 1600, when it is probable he was living. He ſpent part of his time at *Copt-Hall*, in *Eſſex*, or at *Biſhop's-Hall* in *Middleſex*, at each of which places he had a country-ſeat; but his town reſidence was *Lincoln's-Inn*.—His *Jewel-Houſe* was publiſhed by Dr. *Beati*, commonly called, in *England*, Dr. *Boat* (who, by the way, was as great a genius in huſbandry, as moſt we have mentioned) and the *Flora's Paradiſe* (with a ſecond original part) was publiſhed by one *Bellingham*, the author's kinſman, who changed the title to the *Garden of* Eden.

Sir *Hugh* held a correſpondence with all lovers of agriculture and gardening throughout *England*. And ſuch was the juſtice and modeſty of his temper, that he always named the author of every diſcovery communicated to him.

In a word, no one man in any age ever diſcovered, or, at leaſt, brought into uſe, ſo many new ſorts of manure. Witneſs his account of the COMPOST and COVERED DUNGHIL, and his obſervations on the fertilizing qualities lodged in SALT;—STREET DIRT AND SULLAGE OF STREETS in great cities;—CLAY;—FULLERS EARTH;—MOORISH EARTH;—DUNGHILS MADE IN LAYERS;—FERN;—HAIR;—CALCINATION OF ALL VEGETABLES;—*Malt-duſt*;—*Willow-tree earth*, *Soap-boilers aſhes*; and *broken pilchards* and MARLE.

See more concerning aſhes in *Virg. Georg.*—*Varro de Re Ruſt.*—*Columella de Cult. Hort.* Lib. x. v. 354.—*G. Plattes* aſſures us, that aſhes, mixt with lime, kill moſs in meadows, and prove likewiſe an excellent graſs-manure. *Diſcoveries*, p. 29.—And therefore, ſays *Falkingham*, it was an obſervation of the antients, "quod lætas faciunt ſegetes ſtercoratio, interriſſio, & *cinerum ſparſio*."

It was well known to the *Greek* writers on husbandry that ashes were great improvers of grasses, and *Didymus* observes particularly, that they were one of the best manures then known: "For, being small, penetrating, and warm, they killed worms and all pernicious insects." And an anonymous author, about the middle of the last century, in a letter to the famous *Hartlib*, remarks, "that ashes produce the white and purple honey-suckle (clover), if sown on the ground in *February*, and that so copiously, till the field appears to be candied with ashes like a hoar frost." [e]

And here (as ashes are a favourite manure with the writer of these Essays, when the question is concerning the improvement of grass-lands) if any *one* should object, that he finds nothing *new* in the practice now recommended, we can only answer, that people, in works of this nature, ought to seek for *profit* rather than *novelties:* And that every man should thoroughly consider the nature of his own soil, and vary his agriculture according to circumstances.

SECT. VIII.

Whether Lucerne impoverishes the Ground? Answered in the Negative.

WHETHER a quick-growing vegetable, of so long continuance as lucerne, impoverishes the ground, is a point that well deserves to be examined. Common husbandmen start at the very proposal of this query (having, for their own part, no doubts but that lucerne acts in this manner) and some of them, to say truth, have made the objection themselves. "How," observe they, "can a plant,

[e] Published in Quarto, *London*, 1656, and supposed to be written by Dr. *Beale*.

plant, which is cut near fifty times in ten years, produce any other effect upon the ſoil than to weaken and exhauſt it?"

To which my anſwer ſhall be as follows: Only let it be remembered, that I cannot ſpeak from my own perſonal knowledge to one particular part of the query, becauſe I have not as yet outlived my firſt plantation; but many foreign cultivators of this vegetable aſſure me (and they are perſons of great experience, as well as probity and veracity) that wheat and other kinds of grain have proſpered ſurprizingly on the very ſpots of ground where lucerne-plantations had been diſcontinued, after having ſtood ten or more years. This being matter of fact, I ſhall ſay nothing farther concerning it, but ſet myſelf to inquire into the reaſons why the ground is not impoveriſhed.

Firſt (at leaſt according to my notions) the field is refreſhed from time to time with gentle dreſſings: —Secondly, weeds will not greatly impoveriſh the ground, when our main buſineſs is to extirpate them:—Thirdly, one half of the field lies fallow, [o] and is ſtirred frequently for ten or eleven years, provided the lucerne laſts ſo long:—And, fourthly, it muſt always be remembered, that this graſs ought to be cut, whenever a ſmall number of healthy [p] plants begin to ſhew their flowers in full bloom: *Which circumſtance well deſerves notice*, for all plants weaken the ſoil and draw double nouriſhment, when they ripen their ſeeds.

Laſtly, there is another reaſon which may be looked upon as equal to the four already mentioned.

[o] "Lands, cultivated in intervals of a proper breadth, produce, and lie fallow, as half to half at leaſt."
Experiences ſur la Nouv. Culture, tom. vi. p. 33.

[p] I name the word *healthy* expreſsly, becauſe, *ſickly*, *ſtunted* plants, ſometimes blow prematurely, and therefore are no true guides to us.

ed. All plants that *bear leguminous flowers* (as lucerne, sainfoin, trefoils, vetches, *&c.*) *enrich the ground*, [f] and of this the husbandman has daily experience in the culture of clover.

It may be observed too, that all cattle are particularly fond of leguminous herbs, and even leguminous shrubs; as the *cytisi* of every kind, the falsified *cytisus*, and the *algarobale*, or *Spanish valantia*, *&c. &c.*

I have ever looked upon the culture of leguminous plants, for the better support of cattle, to be *one* of those sorts of improved culture which Providence has decreed to man as a reward for industry in husbandry. The neatness, diligence, and constant little attentions requisite for managing them, seem to imply what Scripture has predicted concerning the *anxious* cultivation of the earth; and, by way of remuneration to the husbandman, he finds, by experience, that his cattle prefer such food to the very best common grass he can give them.

SECT. IX.

Of the Head-lands, Hedges, and Aspects of a Lucerne-plantation.

WHichsoever way the cultivator determines to place and dispose his transplanted roots (and much depends on the situation and aspect of the rows) let him always remember to leave an head-land at each end of the lines or rows, about eight feet wide, for the horse and hoe plough to turn in: And, the moment the whole work of transplantation is finished, cause these head-lands to be ploughed, har-

[f] DURANTE observes, as long ago as the year 1585, that lucerne, even when sown the broad-cast way, enriches the soil instead of impoverishing it: And so do all leguminous plants.
Herbario Nuovo, Fogl. in Roma, p. 279.

harrowed, and raked clean; and ſow them with fine ray-graſs, to the amount of ſix ounces to every perch ſquare; adding, if he thinks fit, a little white *Dutch* clover and hop-trefoil. Theſe graſſes may be mown occaſionally, as green food is wanted; and thus no ground will be loſt.

I have here given the preference to ray-graſs, becauſe it forms a firm ſwerd, by reaſon of its ſtrong matted roots. But if the weight of the horſe, plough, and ploughman, ſhould break the contexture of this new-raiſed turf the firſt year (which is an accident that may partly be expected) then gently ſcrape the broken earth together, and flatten it lightly, having ſown freſh graſs-ſeeds thereon.

Nor may it be amiſs to make a ditch near the hedges to keep hurtful weeds from incroaching upon the field. Cut alſo, before ſeeding-time, all foul weeds that grow in and cloſe to the hedges, and lop ſuch boughs of trees and ſhrubs as drip over the lucerne, or obſtruct the ſun-ſhine. Otherwiſe it will fare with lucerne as with the ſuckers which *Virgil* deſcribes growing under the ſhade of their parent-tree:

——— Altæ frondes & rami matris opacant,
Creſcentique adimunt fœtus, uruntque ferentem.

For lucerne diſlikes ſhade and watery ſituations, but fears not a free air and open healthy expoſures. Therefore, if poſſible, always tranſplant it where the ſun has full power; and avoid, at the ſame time, as much as you can, the choice of all eaſtern and northern aſpects.[d] An antient *Engliſh* writer on huſbandry

[d] No one ſeems to have underſtood the choice of ſituations and aſpects better than *Democritus*: Vid. *Geopon.* Lib. v. c. 4. Though there are reaſons to think, that this antient writer on huſbandry was, in general, more abſtruſe and ſpeculative, than ſcientifical and practical. "Whilſt his mind," ſays *Horace*,

"was

bandry ſpeaks with much good ſenſe and experience upon this occaſion. "A north-eaſt aſpect, ſays he, "guarded with plantations properly ſituated, is protected from the winds beyond all diſpute; but the ſhade of the trees hurts the ſoil, and the effluvia from them taint the air. Hills and mountains therefore are the beſt protection." [d]

SECT. X.

The Produce and Profits of an Acre of Lucerne.

IT is ſomewhat hazardous, before one has made experiments upon lucerne for ten ſucceſſive years at leaſt, to attempt ſpecifying what quantity of green food or hay, and what profit, in point of money, an acre of lucerne may produce annually? Yet the little we have to ſay upon that ſubject, from the obſervations of ſix or ſeven years, ſhall be imparted candidly to the public.

It is certain that lucerne, at various cuttings, may grow in *England* ten or twelve feet high in a year; and that the ſtalks, at each cutting, being rarely more than a month old, are as juicy, tender, and nouriſhing as the leaves.

One perch [e] cut five times in the year 1758 (as was the reſt of the plantation) weighed, taking the whole five cuttings together, one hundred pounds of green food; which makes the annual produce of an acre to be very conſiderable, even in the firſt year after tranſplanting: For in *that* year the experiment was

'' was wandering far from its home, the cattle broke through his '' fences and deſtroyed his choiceſt fields."

——— Democriti pecus edit agellum;
Dum peregre eſt animus.

[d] SCOT's *Perfect Plat-form*, &c. 4°. 1576, c. 3.

[e] *N. B.* The perches, in the county where this firſt experiment was made, are 18 feet ſquare.

was made. In a word, the produce amounted to about eight tuns of green lucerne, which was ſufficient to keep two coach-horſes near five months, and fatten a ſmall heifer beſides.—Yet this calculation muſt not be looked upon as an exact one, for the eſtimate was formed merely from motives of private curioſity, and without any view of making it public.

In the year 1761, as before-mentioned, I gave directions for making a ſmall lucerne plantation in *Berkſhire*. The little field, or cloſe, conſiſted of one rood of ground, or a quarter of an acre; which we threw into fifty-four rows, each row containing one hundred and ten plants, or five thouſand nine hundred and forty in the whole. In the ſecond year after tranſplanting (and lucerne is not then arrived to its due ſize) and at the firſt annual cutting (which is not the beſt cutting, as the herbage ſuffers much from the winter) I weighed, out of curioſity, a parcel of the prime plants which, one with another, weighed about one pound and a quarter each. But, ſuppoſing that every plant weighed only one quarter of a pound, and admitting we give up the ſixth cutting (which is more than one need to do;) then the crop of forty perches, or one fourth of an acre, amounts to a very conſiderable return of ten tuns, at leaſt, of green lucerne *per* acre.

Of larger crops, let others ſpeak in the following part of this Section.

As to what relates to myſelf, I would never chuſe to raiſe the expectations of the public, in matters of huſbandry, to an undue height. Nothing is more flattering to a true lover of agriculture and his country, than to hear that his own crops are exceeded by thoſe of other cultivators, whilſt they pleaſe themſelves with the thoughts of having outſtripped their inſtructor, who concealed, through diffidence, a part of what he had reaſon to believe,

or

or chose ground, of a *middling quality*, for the *field of experiment*, merely that he might not tempt people to expect too much. If it had been his design to have raised lucerne from a principle of vanity, and not general utility, he would have chosen an *hop-garden* just discontinued, and which lay hard by the field which bore the produce above spoken of.

With relation therefore to other men's crops, messieurs *de Chateauvieux* and *Eyma* assure the public, (tho' they never cut their lucerne oftener than it is cut in *England*, and very little higher or larger than what may be observed in its growth here,) that they have received from *one acre*, [c] in one year, five tuns of

[c] Foreign books, relating to husbandry, are in some principal cases uninstructive to us, except we know the *measures of land and grain*, in the countries where the authors writ. For example, how can an *English* reader in general form a judgment concerning the result of an experiment, if a *French* author says he drilled twelve *litrons* of wheat on a *danrée* of land, and his production of grain amounted to a certain number of *septiers?* How, I say, is an *English* reader to understand the passage, if a translator does not explain himself by *English* measurement of land and grain? And this ought to have been done in all the late translations made from M. *du Hamel*, who is particularly exact in recounting his experiments. In this case, dictionaries as often mislead us, as help us. Thus *Boyer* and others, render *boisseau* a bushel: Now the common difference, between a *boisseau* in *France* and a *bushel* in *England*, is as 32 to 63, or thereabouts.

Similar names, assigned for certain superficial measurements of land, contain different quantities of land in different countries, and very frequently in the same country. We will give an example in the words *jugerum*, *acre*, and *arpent*.

It is natural to imagine, that the *Roman jugerum* admitted variations, as well as the *acre* and *arpent*. That which *Columella* mentions contained 28,800 *Roman* feet, or, in our measure, 27,849.

An *English statute-acre* consists of 160 perches, 16 feet and $\frac{1}{2}$ square. Each perch contains 30 square yards. Forty perches long by 4 broad constitute such an acre, which will be 240 yards long by 24 yards-broad. Of course such an acre will consist of 4800 square yards, or 43,200 square feet.

The *customary* acre of the west of *England*, *&c.* consists of perches 18 feet square, and contains about 19 more statute-perches than the statute-acre.

I shall

of well-dried hay. Now, if ſuch be the caſe, then, agreeably to what is remarked in another place, [d] (one pound of green lucerne making but four ounces of cured hay) of courſe the produce of their acre muſt be twenty tuns of undried fodder.

M. *Eyma*, [e] in the year 1755, had, at one cutting from a ſingle acre, 14,445 pounds of green food. M. *du Hamel*, at *that* time, ſuſpected ſome miſcalculation in this account; but M. *Eyma* made it appear that the original computation was juſt.

The ſame gentleman cut, from what he calls one *journal*, [f] as much lucerne-graſs in a year as produced near five tuns of hay, or, in other words, about twenty

I ſhall ſay nothing of the antient *foreſt-acre* in *Nottinghamſhire*, *&c.* whoſe perches were 18, 21, and 22 feet ſquare. See *Falkingham's Survey*, 4to, 1610.

A *Welſh-acre* contains about two *Engliſh* ſtatute-acres.

An *Iriſh* (plantation) *acre*, makes an *Engliſh* ſtatute-acre and $\frac{1}{2}$.

The *little French arpent*, about *Paris*, contains 100 perches of 18 feet and $\frac{1}{2}$ ſquare; which makes in ſuperficial meaſure *(pieds de roy)* 32,400 feet.

The *middle arpent* conſiſts in like manner of 100 perches, 20 feet ſquare; which makes in ſuperficial meaſurement *(pieds de roy)* 40000 feet.

The *great arpent* (water and foreſt meaſure, commonly called *meſure de roy)* conſiſts of 100 perches, 22 feet ſquare; and contains 48,400 feet *(pieds de roy.)*

The *acre* of *Normandy* has 160 perches, the perches 22 feet ſquare; and contains ſuperficial feet *(pieds de roy)* 77,440.

The *Flemiſh* acre, or *gammat*, anſwers to an acre and $\frac{1}{2}$ *Engliſh* ſtatute meaſure.

As to the *Italian acre*, each *tavola*, if I remember right, is 2 feet ſquare; 25 *tavole* make a perch *(pertica;)* and 4 ſuch perches conſtitute an acre, *(jugero.)*

The *Swiſs* acre contains 31,250 feet, *pieds de Berne.*

Theſe remarks will ſerve to explain, throughout the preſent work, moſt accounts relating to experiments made by foreigners on certain quantities of land.

[d] See the next SECTION.

[e] The late death of this gentleman deſerves much to be lamented by all lovers of agriculture.

[f] The meaſure of land, called *journal* in *France*, ſignified originally as much ground as one man and two horſes could plough in

twenty tuns of green fodder. This may be looked upon to be a very luxuriant crop; and yet there is a memorandum annexed to the preſent Eſſay,[c] which ſhews that *England* has produced as much lucerne, or pretty nearly as much, at one cutting, and at every cutting.

But, in the laſt place, M. *du Hamel*, as the reſult of all his former experiments, informs us, that he has received ten tuns of hay (or forty tuns green) from a ſingle acre of tranſplanted lucerne.—Now, conſidering the ſuperior excellence of lucerne-hay, ſuch crops, taken from an acre in one year, may be reckoned worth thirty pounds:—So that, from the account here related, I cannot help imagining that this muſt have happened in ſome year that was particularly favourable to the growth of lucerne. Leſs than half ſuch a product would content me, and I dare ſay moſt of my countrymen.

From what has been repreſented by others, ſurely the public will not think me confident in aſſerting, that an acre of tranſplanted lucerne rightly managed will bring in 5 *l.* a year, free and clear from all expences, and that for a conſiderable tract of time. Now certainly this advantage deſerves well to be conſidered: For the huſbandman is ſaid to be a good manager who makes three rents each year: A firſt for the land-lord, a ſecond for labour, *&c.* and a third for himſelf: But an acre of lucerne will for ſeveral years produce *five* rents, clear of all out-goings for rates, rent, workmen, manure, *&c.* ſuppoſing the land to let at 15 *s.* an acre, as uſually happens in moſt eſtates that lie at ſome diſtance from

in a day; which computation muſt vary, as the ſoil is more or leſs manageable: At preſent, it actually does ſo in different provinces; but I am informed that the *journal* where M. *Eyma* lived contained 888 *toiſes* ſquare, or 31,968 ſuperficial feet; which production is very aſtoniſhing, as the ground did not make quite three quarters of an *Engliſh* acre.

[c] *Elemens d' Agriculture*, 1762, tom. ii p. 133.

from cities and market-towns. On the contrary, if land be dearer near rich populous places, the ground will be better, and the produce more advantageous. This gives lucerne its value near towns and cities, where two or three acres may be rented, but ten or twenty cannot; and ſure it is ſome advantage in huſbandry to make one acre ſupply the place of two or three, and eſpecially where it is difficult to rent land, even at a very high price.

It is certain, that the profits, ariſing from tranſplanted lucerne, have been no-ways exaggerated in my account; for by ſome collateral obſervations it may be eaſy to carry the value of an acre ſomething higher than has been here repreſented. Suppoſe *green vetches* (which are rarely cut more than once) and *green lucerne* to be of equal value as food for horſes; (which is making a ſuppoſition no good writer on huſbandry will allow to the diſadvantage of lucerne:) Now a perch of green vetches (if the crop be good) ſells for ſixpence at ſeventy miles diſtance from *London*, and a perch of tranſplanted lucerne will weigh as much, or very nearly as much, at two cuttings, out of the four or five annual curtings: Which (every circumſtance being duly conſidered) brings an acre of lucerne (to ſay the leaſt of its advantages in huſbandry) to be of equal value with two acres and an half of vetches. Not to mention that lucerne is a perennial plant, and vetches are annual; which, upon the whole, makes a new difference in point of profit.

SECT. XI.

A Difficulty in Columella *explained, when he says, "That one Acre* (JUGERUM) *of Lucerne, will maintain three Horses plentifully the whole Year."*

I Come now to a difficulty which always has embarrassed me. It is remarked with confidence by *Columella* and *Palladius*, *That a single acre of lucerne will maintain three horses plentifully the whole year round:* Unum jugerum ejus toto anno tribus equis abunde sufficit. Now the *Roman* acre, or *jugerum*, (for we ought rather to anglicize the *Latin* name) was *one third less* than an *English* acre. However, I have in part explained the difficulty in a note to page 30, where it is represented that the antient *Romans* performed all the drudgery-work of husbandry by oxen, and not horses: And that a *jugerum* of lucerne would hardly maintain two large labouring oxen (by their own account of feeding them) throughout the whole year. For *Varro* tells us, that the husbandman allowed 20lb. of lucerne-hay, at night only, [d] to a working ox. Now 20 lb. of lucerne-hay amounted to 80 lb. weight, when the herbage was green.

As most writers have been imitators (or transcribers rather) one from another in matters of husbandry; so of course no one has ventured to controvert these assertions of *Columella* [e] and *Palladius*, [f] but admitted them implicitly for the space of 1700 years. Nevertheless, I cannot help suspecting that the *Roman* authors *exaggerated a little*; for as the methods of drilling, transplanting, and horse-hoeing were then unknown, (and as we have raised greater

[d] *De Re Rustica*, edit. *Steph.* p. 23.
[e] *De Re Rust.* Lib. ii. c. 2.
[f] *De Re Rust.* Lib. iii. *Mens. April.* tit. 6.

greater crops by theſe means, than ever were raiſed by broad-caſt promiſcuous ſowing, even in *Italy)* I cannot eaſily induce myſelf to believe, that *three* quarters of an *Engliſh* acre will maintain plentifully three working horſes the whole year round. Nor do I imagine it can be done either in *France* or *Italy* at preſent. [d]

The ingenious *Hartlib*, in more expreſs terms than others, revived the ſame aſſertion, about one hundred years ago: But I believe ſomething may be offered in his excuſe, though he foreſaw no objection to a ſeemingly eſtabliſhed truth, and conſequently never guarded againſt the objection.

This author (as was the faſhion of the age in which he lived) took moſt of his notions in agriculture from the *Flemings*, who at that time gave the tone of huſbandry to all *Europe*. Now a *Flemiſh acre*, or *gammat*, may perhaps verify his aſſertion to a good degree: For the *gammat* contained *one* of our acres and *an half*, being ſimilar to the *Iriſh* plantation acre, and conſiſting of 160 perches, 22 feet, ſuperficial meaſure in every ſenſe.

I have often conſidered how far it is poſſible to verify this aſſertion of the antients, even upon ſuppoſition that the *Romans* laid the main ſtreſs of ploughing, and other hard labour, upon large oxen, and not on horſes; and that the farmers horſes of thoſe days were generally ſmall hackneys, uſed more for riding round the fields, than for the heavier and more ſolid drudgery of agriculture.

Now, according to my ideas and experiments in husbandry, *that* perſon muſt be an excellent manager who can keep two good cart or coach horſes, all the year round, upon an *Engliſh* acre of lucerne.

[d] Mr. *Miller* gives me countenance in this opinion. For, when he ſays that one acre of lucerne will keep three horſes the whole year, he cautiouſly aſſures us, "That he makes the report upon the authority of foreigners."

For these two horses will consume near 80lb. weight of green food in a day and night, (with some dry food besides) and the owner likewise must allot three tuns and an half of hay, [b] for their winter-support, during a space of seven months. Now it will be difficult to maintain these two horses five months with green lucerne, and steal one cutting (that being probably the best cutting too) for making hay. [Nor will the hay then be sufficient, except mixt with straw, as recommended elsewhere. [c]]

Upon the whole, therefore, the most feasible way of justifying the opinion of the antients is to fat a large heifer of the *Somerset*, *Derby*, or *Lincolnshire* breed (and there may be green food enough to answer that purpose) at the same time you maintain your horses with daily cuttings of lucerne; and then expend the profit arising from the sale of the heifer, as far as it will go, in purchasing hay for winter.——

In this sense a fine acre of lucerne (our acre being one fourth larger than the *Roman*) may be brought to verify, or nearly verify, the assertion of *Columella* and *Palladius*.

M. *du Hamel* has approached nearer to the opinion of the antients, than I have taken upon me to venture. Questionless, he had better success in his husbandry-attempts, and consequently better reasons. His remark is, "That one good acre of lucerne, at three prime cuttings only, is superior in quality and equal in quantity, at each time of cutting, to the produce of two acres of natural grass in dry meads: Since such fields, if we act like prudent

[b] A most ingenious nobleman of great rank and station, who understands all the parts of agriculture to perfection, has been pleased to discourse with me upon this subject, and many other particulars contained in the present Essay; and, after a comparison of his calculations with mine, the quantity here specified seems to come very near the medium, supposing horses to have their customary allowance of corn at the same time.

[c] See SECT. xviith of this ESSAY.

dent husbandmen, ought never to be mown but once a year; conſequently one good acre of lucerne is equal to ſix good acres of common paſture lands: ——And, if the ſame compariſon be extended to downs, heaths, and commons, which are generally ſuppoſed to produce but one fourth as much as incloſed paſtures tolerably well managed, then a ſingle acre of good lucerne is as *twenty-four* to *one*, when compared with the laſt-mentioned grounds."

SECT. XII.

Of feeding Horſes with Lucerne.—Lucerne recommended to our Colonies.

HORSES fed with lucerne, except when employed in journeys, or other hard work, will need neither oats nor beans; and this we relate from the authority of M. *du Hamel*. Nay, thus much has been obſerved in *England*, that no food makes their coats ſo ſmooth, marbled, and well coloured: Beſides, the good effects of ſuch diet will appear from their livelineſs and briſkneſs. "I gave my horſes, at the ſame time," ſays the *French* author, "three bundles of hay, each excellent in its kind; but, after repeated trials, the well-judging animals have ever given the preference to lucerne. I then ſuppreſſed their allowance of oats, and fed them with the hay of this plant chopped in the ſame manner as they cut ſtraw for horſes in *Spain*. Since that time, my coach-horſes are in finer order than they were before, and have acquired ſuch ſtrength and ſpirits, that it is eaſier to make them move with velocity, than to govern them."[a]

Horſes, *at firſt*, ſmell to lucerne very cautiouſly, taking it ſometimes in a quarter of a minute, or ſometimes ſooner; and, having chewed three or four

[a] *Traite de la Cult. des Terres*, tom. iv. p. 523.

mouthfuls, ſeem to ſollicit earneſtly for more. Some horſes may heſitate longer, but they all eat [c] it, if a ſmall parcel is laid in the manger, and you leave them quiet and alone. Nay, even the ſhieſt of theſe creatures, having once known the taſte of lucerne, eat it afterwards very freely. But any delicious nouriſhment, though healthy in itſelf, may prove unwholeſome and dangerous, if given to cattle in *undue* quantities.[d] Therefore, when a large horſe firſt feeds on green lucerne, increaſe his allowance gradually, for the ſpace of three weeks, from ten pounds a day, to twenty, thirty, and perhaps forty pounds: But, as we pretend to no degree of ſkill in feeding horſes, except for the purpoſes of common labour, it may be more proper to refer their each day's allowance to the determination of knowing and curious perſons, who, after accurate obſervation upon a certain number of experiments, will eaſily diſcover the proper middle quantity which is moſt convenient.

Under this article, other precautions are to be taken.

Lucerne-graſs muſt be given in ſmall quantities, and at certain periodical diſtances, to ſuch horſes as are touched in their wind. [e]—In which caſes, lucerne-hay alſo may be ſlightly moiſtened with pure ſweet water.—Remember alſo, that green lucerne is

[c] I have never yet known a horſe refuſe *true* lucerne, ſooner or later; but have been informed, by perſons of credit abroad, that they have obſerved an inſtance or two, where horſes have continually abſtained from eating it. Such very rare exceptions prove little or nothing againſt the grand general rule. Graminivorous animals may have their whimſies and antipathies, as well as men have them. I have often obſerved cattle to be very fantaſtic in their choice of food. The goat has the appearance of a coarſe glutton, and yet, at the ſame time, is the moſt faſtidious, capricious, epicure, in the univerſe.

[d] *Herbario* di Caſtore DURANTE. Fogl. in *Roma*, 1585, p. 279.

[e] This is related on the authority of the late M. *Eyma*.

is too full of nouriſhment for running-horſes, except it be uſed to *ſoil* them early in the ſpring. Leſſer quantities likewiſe muſt be given to fine hunters and ſaddle-horſes than to coach, poſt-chaiſe, or cart horſes: As the former are of ſmaller ſize, as well as of a more delicate habit of body.—And again, when horſes, *&c.* are firſt fed with green lucerne in ſpring, it may not be amiſs to take from them a little blood. This advice ſeems to be ſuggeſted by no leſs perſons than *Pliny* and *Palladius*: And the reaſons aſſigned are, that ſuch food is flatulent, and increaſes blood. [c] But what the *Roman* authors juſt ſuggeſted old *De Serres* confirms, by his own experience, in expreſs terms. [d]

And a *Swediſh* writer, of good experience, is ſtill more explicit upon this ſubject. "Thoſe," ſays he, "that would feed horſes, kine, and ſheep, as they ought to do, ſhould give them a ſmall portion of food, five or ſix times a day, at ſtated hours, and not at three times only. The cattle then will never be ſatiated, but eat with appetite, and make no waſte." [e]

Gentlemen who cultivate lucerne will always find it moſt convenient and profitable to order their beſt horſes to be brought into the ſtable about eight in the morning, and appoint them their dividends for the day parcelled out into equal portions; one to be allowed them when they firſt come in, a ſecond at mid day, and a third at four in the afternoon: Permitting them to remain cool and quiet under ſhade, and ſending them to the field at ſix in the evenings, where they may ſhift for themſelves

[c] Dari non ad ſatietatem debet, ne deplere ſanguinem neceſſe ſit. *Hiſtor. Natural.* Lib. xviii. c. 16.

Prius parcius exhibenda eſt novitas pabuli; inflat enim, & multum ſanguinem creat. *De Re Ruſt.* Lib. v. tit. 1.

[d] *Theatre d'Agricult.* Lib. iv. c. 4. p. 270. fol.

[e] *Oeconomie Rurale Suedoiſe* à Zurich, 1761.

each night in ſome common paſturage.—Their continuing all day in the ſtable, during the violent heats, will free them from the vexation of flies, and prevent their ſkins from being tanned, or ſun-burnt. The manure they thus make will more than pay the trouble of bringing them in; for lucerne cleanſes their bodies ſurprizingly, and cauſes them to diſcharge large quantities of foul urine, [h] as will appear from the abundance of litter which they will ſoil, trample, and moiſten in one day.

An horſe will eat fourteen or fifteen pounds of lucerne and glean up every ſprig, in about a quarter of an hour. He then uſually lies down and ſleeps.

Thus much might ſuffice for the preſent ſection; but having ſpoken ſo largely, and that from experience, of the ſuperior excellency of lucerne as a food for cattle, and the advantages which ariſe from the culture of this vegetable; let it be permitted me to recommend, with ſome degree of earneſtneſs, the care and culture of the ſame vegetable to all our colonies, and eſpecially to ſuch as are ſituated in warm climates, where green herbage is ſcarce either for feeding, or fatting cattle; and ſo much the rather, as the plant, here ſpoken of, is known to proſper extremely well in *Peru*, *Mexico*, and countries adjacent, from ſeeds that had been carried thither by the natives of *Old Spain:* And highly uſeful it is found to be in ſuch hot climates, where the natural ſoil hardly produces any common herbage fit for cattle to feed on, the ordinary graſs being of the *ſavannah* kind, immoderately long, dry at bottom, and rotten. On this account the huſbandman brings green lucerne every day into *Lima*, *Quito*, and other cities;

[h] "The urine of an horſe will be more powerful in manure, than the dung of the ſame creature, except it be preſerved in a moiſt ſhaded compoſt-dunghil."

G. PLATTES.

cities; and thus the town's-folks ſupply their horſes, cows, *&c.*

This therefore may be looked upon as a plant capable of thriving in moſt ſoils and ſituations from the equator almoſt to the poles; ſo that, upon the whole, one may venture to pronounce it a ſort of univerſal grower: A free citizen in almoſt every part of the known world.

If we caſt our eyes on *Jamaica* [b] and *Barbadoes*, lucerne might be found to be more uſeful (in the laſt named iſland eſpecially) than in any other of our *Engliſh* colonies; land being ſcarce there, the inhabitants numerous, and food for cattle much wanted, as well as fleſh-meat for man. Of courſe the two *deſiderata*, in that iſland, are an augmentation of paſturage and an increaſe of animal food. It is true, the few weak attempts hitherto made for raiſing lucerne have miſcarried, merely becauſe they were weak, indolent, and injudicious; but *ab abuſu ad uſum non valet conſequentia.* I ſhould not blame our coloniſts ſo ſharply, if what I ſay were not grounded upon the authority of perſons well ſkilled in agriculture, who have lived in *Barbadoes.*—Let the

[b] I cannot learn that any attempts have been hitherto made to cultivate lucerne or ſainfoin in *Jamaica*, though good graſs-fields are much wanted in that iſland, and bring the owner great profit. The inhabitants have only cultivated *two improved graſſes*; the larger panic, a native of the country, and indeed of moſt countries, (erroneouſly there called *Scotch* graſs) and a ſpecies of *polygonum*, or *knot-graſs*, which was firſt brought thither from the coaſt of *Guinea*. This vegetable, which affords good food to all cattle, but excellent food for ſheep, is well known to ſome curious cultivators in *England*, being a ſmaller ſpecies of the famous *Maddington-graſs*, which flouriſhes in one particular ſpot, between *Warmiſter* and *Ambreſbury, in Wiltſhire.* It grows in *Jamaica* almoſt as faſt as tranſplanted lucerne does with us, and is reckoned near *Kingſton* to be worth *ſo much per* acre, that I dare not venture to print the aſſertion. (See Dr. *Patr. Browne's Hiſt. of Jam.* p. 133.)

Broad-clover ſeeds were carried thither about twenty years ago, and grew extremely well.

the culture of the plant in queſtion only be managed, according to the *local* directions given in the laſt paragraph upon this ſubject; and then the probability of lucerne's proſpering in this iſland is at leaſt as *ten* to *one*: And ſurely the cultivation of lucerne is of vaſt conſequence to any populous country, when ten thouſand acres may be made equal to thirty thouſand, and the land to realize thoſe thirty thouſand acres (in meaſurement) is not to be had.

From what cauſes then have our *Barbadoes* coloniſts miſcarried? Probably from an ignorance of lucerne-culture in general: Or through a remiſſneſs in deſtroying weeds. We may conclude likewiſe, that the fields were not ſufficiently pulverized to a certain depth, nor the intervals between the rows properly hoed, eſpecially in ſummer. For ſuch practice would have kept the roots cool during drowth and burning heats, (eſpecially in the firſt and ſecond years, when ſuch danger is moſt to be apprehended [e].) The roots alſo would have found freer room to expand themſelves; and, as they had gained ground, the branches would have been enabled to draw more nouriſhment from the influence of the atmoſphere. All theſe circumſtances combined may, I think, account for the accidents abovementioned.—Nay perhaps (for I forgot to inform myſelf in *that* particular) the lucerne-ſeed might be ſown broad-caſt way in the manner of clover, no other grain of a quicker growth being mixed with it, in order to keep the young lucerne cool and ſhady: Which practice would have been as proper in *Barbadoes*, as it is abſurd in *England*.

This example may convince the reader how dangerous it is to miſcarry through wilfulneſs, ſelf-confidence, or weakneſs, in making any new, uſeful experiments of huſbandry. The whole neighbourhood

[e] Obſerve here, that the author is only ſpeaking of very hot countries.

bourhood is diſmayed at leaſt for half a century: And of this I could give almoſt as many inſtances as there are counties in our kingdom.

Neglect therefore, as to weeding and hoeing, and want of attention to local circumſtances, produced this miſcarriage in *Barbadoes*. It will be in vain to alledge, that drowth and heats killed the lucerne. If ſuch were the caſe, why ſhould it flouriſh even in hotter places? And, as for *England*, I can ſafely ſay, from ſeven years experience, that I never ſaw an indiſpenſable neceſſity for watering lucerne, except the firſt fortnight after tranſplanting, in caſe an extraordinary drowth ſupervened.

Let me alſo obſerve here *relatively*, and by way of exception to my general directions, that cutting the tap-root may be an improper practice, in any country which is ſituated within twenty degrees of the equator. Therefore, in ſuch places, I would prefer ſowing the lucerne in drills without ever diſturbing or amputating the tap-root, and that for reaſons too obvious to be here dwelt upon, as the roots ought to be kept cool, and penetrate as deeply as they can.

Having ſpoken thus of the *Weſt-Indies*, it is natural to conclude, that the *Spaniſh* inhabitants make the ſame uſe of ſainfoin (or at leaſt they ought) as they do of lucerne: Of which former vegetable *Old Spain* has ſupplied them with a very excellent ſort; but, at preſent, I cannot ſpecify the name it bears in *Spain*, for the memorandum ſent me concerning it is miſlaid. The culture of *this* plant likewiſe deſerves to be recommended ſtrongly to our colonies.

SECT.

SECT. XIII.

Of fatting Cattle with Lucerne.

LUCERNE may prove of ſingular ſervice to any populous, manufacturing kingdom, in fatting oxen, cows, heifers, and perhaps ſheep and deer: For cattle, fed with this graſs, may be made fit for ſale more expeditiouſly, as well as earlier in the year, than the farmer, according to the *old* huſbandry, can bring them to market; ſince it is very eaſy to begin fatting with lucerne in the end of *April*, and finiſh about the middle of harveſt, when meat bears an high price.

When you fat theſe creatures, remember to proceed by gentle degrees, in a manner more cautious, if poſſible, than has been recommended in feeding horſes. Nor ſhould you omit taking away from each beaſt a little blood. After certain trials and obſervations, you may venture to give a large ox 40 lb. of green lucerne each day, and perhaps more[d]. Meanwhile the fatting cattle muſt be allowed to range in a ſpare-field, where they may glean moderate paſture, as before-mentioned, when we ſpoke of horſes. Beſides air, motion, and coolneſs are conducive to health, and promote an appetite in cattle, eſpecially at the time of the year when they are fattened in this manner.—As to the quantities that are to be given to fatting cattle, I rather ſhew what *may* be done, than *how* it is to be done.—But time, experience, and more judicious obſervations, than what are here laid down, will bring theſe points to a greater degree of certainty than I can pretend to; for the experiment can never

[d] The antient *Romans* allowed 20 lb. of lucerne-hay at night to a large labouring ox, that was not fatting.
Cato *de Re Ruſt.* p. 23. edit. *Steph.* 1543.

ver be truly made till thirty or forty head of cattle ſhall be fatted with lucerne at one time, and under one inſpector.

It is a favourable circumſtance in fatting cattle with lucerne, that ſuch cattle may be purchaſed in ſpring (though, if bred on the eſtate, the profits will be greater) and cleared from the fields, or, in other words, conſigned to the ſhambles, about *Michaelmas*: So that they will create no trouble nor inconvenience at winter, when the huſbandman is moſt troubled and diſtreſſed to find ſupport for his herds and flocks.

The *convenience*, as well as excellency of lucerne-food, is another argument ſtrongly pleading in its favour; for it may be obſerved, that hardly a weed will be found in a large quantity of herbage.—That not a ſprig will be waſted.—That nothing is bruiſed, half-bitten, ſoiled, or breathed on.——That the cattle, in effect, have a freſh field every day.—And thus one acre may ſtand in the place of ſeveral acres of common graſs that are careleſsly grazed and trampled by feeding beaſts.—Add to this, that there will be no great need of looking out for a change of paſture, ſince the lucerne-food will be equally young, good, and freſh for five months, as every cutting is in effect the ſame thing to them as a new field each day.——And thus the cattle, which eat it, are not liable to become delicate and whimſical in their choice of food, which uſually happens in the common way, when they are half fat: And then the huſbandman is often diſtreſſed, not knowing where to find a freſh ſupply; till, at length, being quite chagrined and out of temper, he turns them over to another year:

——*Ibi omnis*
Effuſus labor. VIRG.

——*deplorata*

———————*deplorata colonis*
Vota jacent, longique perit labor irritus anni.
OVID. MET.

Again, there will be little to fear from ſummer-droughts: For, when the neighbouring fields of common graſs are ſtinted in growth and half parched up, there will be ſcarce any viſible alteration in the flouriſhing ſtate of tranſplanted lucerne, provided it be refreſhed with an hoe-ploughing. In proof whereof, in the year 1758, a fine crop was cut after twenty-one days growth, during the burning heats of ſummer, though no rain had fallen ſince the laſt cutting.

Beeves and kine appear to be very fond of this green food: For in meadows ſown with perennial *German* clover and hop-trefoil (than which few plants are more delicious to cattle) they will trot immediately to their feeder, whenever he comes near them with a burthen of lucerne.—*But ſtill remember, that kine*, &c. *always prefer ſuch lucerne as has been cut a day or two, and ſtood twenty-four, or forty eight hours, in a dry, ſhady place?* [c]

We

[c] The old *French* writers ſeem to be well acquainted with the truth of what is here obſerved: "Ne donnez à ce beſtaile [la bouine] que de luzerne ſeche, encores moderément."
DE SERRES; *Theatr. d Agricult.* fol. 1600. p. 270.

Again, lucerne muſt be given with more caution to *cows* than *horſes*, for the latter purge greatly by urine upon firſt eating it, and afterwards in about ten days begin to grow fat.
IDEM, p. 171.

Near fifty years before *De Serres* communicated his huſbandry-obſervations to the public, *Agoſtino Gallo*, a nobleman of *Breſcia*, remarked, that, though cattle eat green, freſh lucerne with the greateſt pleaſure and avidity imaginable, yet ſtill it was the moſt prudent management to leave it to perſpire and dry twenty-four hours at leaſt after cutting; ſince, in caſe ſuch precaution be taken, it will not injure cattle, as freſh clover and trefoils are found to do:

We make no doubt but ſows and pigs may be brought into extraordinary good plight by being fed with green lucerne, but, having never made the experiment, ſhall refer the reader to his own obſervations.—Nor have we much to ſay concerning feeding and fatting ſheep with green or dried lucerne, partly becauſe we took this article *pro confeſſo*, as all writers, antient and modern, agree that no one plant is ſo acceptable to them, or ſo nouriſhing. Thus much I know from my own experience, that ſheep will eat lucerne green or cured, when they refuſe every ſort of food beſides; nor can there be a better preſervative, when the rot begins to threaten, than to give them green lucerne mixt with a little buck-bean, [d] or lucerne-hay moiſtened with freſh brine.

Under this article we ſhall only add, that, when oxen or heifers are fed for the butcher with lucerne, that the fat will ſpread itſelf like veins in marble thro' the lean fleſh, which many travellers have obſerved in the famous mutton near *Montpelier*, called *mouton de gange*; both which circumſtances proceed from a ſimilar cauſe. The beeves eat lucerne, and the ſheep feed on a wild ſweet-ſcented roſemary.

SECT.

do: "Anzi che ordinarimente la mangiano piu volontieri verde, ma biſogna darliela dopo un giorno che é tagliata, percioche potrebbono patire per la troppa morbidezza che é in lei, quando la mang'aſſero freſca et non paſſa. Ma dandola al modo detto, non ſculda, ne offende gli animali, come fà il trifoglio, & altre herbe freſche, anzi li mantiene ſani et gagliardi."

Giornata IIda della Medica, p. 37.

[d] The *marſh-trefoil*, commonly called *buck-bean*, is a plant of an unſavoury taſte: And ſheep, when ſound and in health, always avoid eating it; but, when the ſymptoms of the rot begin to attack them, they ſearch for it by inſtinct, and devour it greedily. Where ſuch ſheep are paſtured, no buck-bean is to be found, for in a week or two they devour it all. Might it not be prudent, therefore, in huſbandmen who keep large flocks, to cultivate an acre of *theſe* plants in ſome moraſſy ground, which otherwiſe would not yield them two ſhillings the acre? Some might be cut

up

SECT. XIV.

The early Appearance of Lucerne.

BESIDES the ſuperior goodneſs of lucerne as food for cattle, its early appearance is another particular advantage; for it comes in uſe long before all common graſſes, [b] and even ſix or ſeven weeks before broad-clover or winter-vetches, [c] and at the ſame time continues much longer than the common graſſes: Being young and blooming,

——*Ubi verna novis expirat purpura pratis.*

which makes it more deſirable, not only as a needful ſupport of cattle, but for ſoiling running-horſes, hunters, and road-horſes. In confirmation of this plant's forward growth, it was obſerved, *February* 10, 1760, (though an uncommonly ſevere froſt had happened ſome weeks before) that the lucerne-ſhoots meaſured five inches in height, the common graſs not having then moved; and, by *March* the 17th

up green for unſound ſheep, and given them with lucerne, as occaſion requires; and ſome might be made into hay, and mixed with their fodder. – I cannot remember that this advice has been given by any huſbandry-writer.

[b] The earlieſt ſpring-graſs, in *England*, is what our fore-fathers called *prim-graſs (gramen vernum*, Raii & Merretii *in Pinocath.* Thus the ſaid *prim-roſe*, inſtead of *vernal-roſe.)* This is one of the moſt valuable graſſes, on account of its good taſte and early appearance: It is no where cultivated at preſent; nay, the very name of it is forgotten.

Chaucer ſeems to have known it in its *Flower* and the *Leaf*, and deſcribes it in language not unworthy of the beſt modern poet:

So ſmall, ſo thick, ſo ſhort, ſo freſh of hue.

[c] *Winter*-vetches are ſo called, becauſe, being ſown in autumn, they paſs thro' all the winter's ſeverity, and are larger, ſtronger, and ſooner ripe than vetches ſown in *March*; which uſually bear the name of *ſpring-vetches*.—It is thought they are the ſame ſpecies of vetches.

17th, the ſtalks meaſured fourteen inches. *April* the 9th, the whole plantation was cut, being arrived to full maturity.

But what was taken notice of, *January* 17, 1761, was more ſurprizing; for ſome ſtalks of a lucerne-root (that were not viſible, *October* the 10th, 1760) were then cut, which meaſured four lines of an inch round, and were nine inches high;—of a deep green colour, and very weighty. Another plant the ſame winter was cut twice (about four inches high each time) to make ſome experiments on lucerne-tea. *February* the 27th, it was meaſured and cut again, and the ſtalks were then ſeven inches high. *May* the 20th, it was cut a fourth time, being ſeven inches and an half in height. This was done to make trial, upon cutting a lucerne-plant as often at one pleaſed in winter, whether it were poſſible by ſo doing to check and kill it: But the event proved otherwiſe.

SECT. XV.

Tranſplanted Lucerne preferred.—Sketch of a Parallel between Lucerne and Sainfoin.

AS lucerne is the firſt of all improved graſſes, ſo *tranſplanted* lucerne greatly exceeds *that* which is raiſed in the common way like clover; for each plant arrives to the due perfection of its nature, having ſpace to be produced at large, and air and ſunſhine to render it more wholeſome and palatable. Beſides, in this method of culture, you will rarely diſcover any yellow or ſickly leaves; which happens too frequently, when lucerne is ſown, like clover-ſeeds, with ſpring-corn.

Lucerne exceeds ſainfoin in all reſpects, ſuch as ſize, luxuriance of growth, frequent cuttings, rich taſte, and high nouriſhment: But this is ſpoken of

ſainfoin, as it is now cultivated by the *Engliſh* huſbandmen, and uſually ſown with oats, barley, and ſome mixture of common graſs-ſeeds.—Therefore, of courſe, ſo long as ſainfoin is *thus* raiſed, there is no drawing any well-grounded parallel between *that* and *tranſplanted* lucerne: For, beſides the advantages above-mentioned, the ſtalks of the *latter* are rarely more than a month old, and perhaps full as ſweet and nouriſhing as the leaves; but the ſtalks of the *former* are hard and woody, being ſown uſually in ſpring, and not fit to cut for hay till *June* twelvemonths; and, if it be mown a ſecond time in *September*, then there is danger of impoveriſhing the crops; for manures cannot eaſily refreſh roots, which, when not ſhortened by art, ſtrike down into the earth ten or twelve perpendicular feet.

True it is we have made ſome obſervations on *tranſplanted* ſainfoin, but have not acquired experience enough to ſpeak to the purpoſe. Nevertheleſs, this plant, managed like lucerne, may produce as large a return in quantity, but leſs valuable (though highly valuable) in point of nouriſhment and rich taſte. We thought it proper to make this obſervation, as ſome people may prefer ſainfoin to lucerne: And, if that be the caſe, it is quite needleſs to ſay more, ſince they *both* like the ſame ſoil, ſun-ſhine, expoſure, and culture.

In confirmation of the large returns made by ſainfoin, M. *de Chateauvieux* aſſures us, that he cut, in the year 1756, from a field which had not been manured ſince 1749, two crops of *tranſplanted* ſainfoin, which weighed green at the rate of about *eight* tuns an acre each time.

Nevertheleſs, it is ſome diſadvantage to ſainfoin, that the ſtalks are weak in compariſon with thoſe of lucerne, ſo that *it* is more difficult to be mown; and the branches, often drooping and lying on the ground, contract a mouldy putrified taſte. Rats

and field-mice [c] make great depredations on its roots, but rarely touch thoſe of lucerne, tho' two fields, one of each ſort, may chance to join.

In ſome few points, but in one particularly, the parallel between ſainfoin and lucerne agrees extremely well: for both of them thrive ſlowly, when grazed and trampled: Yet the heavy tread of large cattle is not ſo hurtful to them, as the cloſe nibbling of ſheep.

SECT. XVI.

The revived Practice of harrowing Lucerne examined.

AN attempt has been made lately in *England* to cultivate lucerne, in the manner ſome of the *Roman* huſbandmen cultivated it in the times of *Columella*; and I the rather chuſe to examine this point, as I have always had a deſire to make lucerne uſeful (if that be poſſible) to the common farmer, who has neither leiſure nor inclination to employ himſelf in correct and accurate huſbandry. I have already recounted my own ill ſucceſs in an attempt for that purpoſe, having ſown lucerne, as clover ſeeds are uſually ſown, when we have a mind to turn an arable field into paſturage.

The antient *Romans* had two methods of cultivating lucerne: ONE *in detail* (upon which principle this Eſſay is partly founded) and *one* of a *more compendious* nature. For the huſbandmen of all countries would (if it be poſſible) gain a great deal with

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[c] *La Pluche*, author of the *Spectacle de la Nature*, tells us that theſe little animals are very pompous architects, for their houſe conſiſts of a chamber, ante-chamber, and ſtore-room.

Field-mice, in *French*, *mulots*. The *French* alſo in ſome provinces call *grub-worms mulots:* (See SECTION xxxi.) but the writer here cited ſeems to mean field-mice, as he joins them with rats. *Exper. ſur la Nour. Cult.* tom. vi. p. 155.

very little trouble: *Which* Providence, in general, ſeems to have denied us for the juſteſt reaſons imaginable.

(1.) The eſtabliſhed practice, among the antient *Roman* cultivators, was the *firſt* of the *two* abovementioned. They threw up the field in beds, ten feet wide and fifty long, with paths between each bed, in every ſenſe: That the hoers might have acceſs to the lucerne without mangling it, or trampling it. Beſides, by throwing up part of the earth out of the paths, they made the beds ſomewhat elliptical, and obtained a freer air, *&c.* for the plants.

(2) The *ſecond* practice, amongſt the antient *Roman* cultivators, aimed to reach the point deſigned by a *ſhorter cut*, if I may be allowed to make uſe of the huſbandman's language. Inſtead of hand-weedings, hoeings, diggings, *&c.* in the 2d year they harrowed it boldly, but not raſhly; this operation was followed by a lighter harrowing: After which the weeds torn up were to be raked off. This diſcipline was uſed annually, or oftener, as occaſion required: And, concerning which, I ſhall ſpeak more at large, before I conclude this ſection.

That ſuch practice often ſucceeded among the *Romans*, more or leſs, is inconteſtably true: But, in matters of agriculture, there is no drawing an abſolutely concluſive argument from *Italy* to *England*: And for this ſeveral cogent reaſons have been aſſigned in the 52d page of our Eſſay.—That the preſent *Italians harrow* lucerne, inſtead of keeping it clean, and dividing the earth ſome other way, is more than I remember. If they harrow it, I think the circumſtance would not have eſcaped my notice: But, to ſpeak plainly, the culture of lucerne has declined in that country for an hundred years paſt, and upwards.

Certain it is, that we cannot always argue ſafely in matters of huſbandry from *Italy* to *England*. And there-

therefore, out of numberleſs inſtances, let it be obſerved, at preſent, that *Italian* weeds, in general, are more of the *annual* than *perennial* kind: (Which uſually happens in the warmer climate.) Of courſe, the roots of the *former*, which are placed at a ſhallower depth in the ground, are more eaſily diſlodged than the roots of the *latter*; nor are they, in their own nature, ſo hardy and obſtinate. [a] Hence it happens, that a ſlight harrowing (or a ſcratching rather) may avail more in *Italian*, than in *Engliſh* fields.

A ſingle fibre of a *perennial* weed, if it be left behind in the ground, will prove a formidable enemy the year enſuing; ſo that harrowing can never make the havoc with perennial weeds as it does with annual ones: Eſpecially in a country like ours, that has uſually moiſture and ſhade enough to cheriſh the young fibre in its tender ſtate, when it is left diſmantled from the parent-root.

I may add farther, that the ſettled ſummer-drowths and burning gleams of ſun-ſhine in *Italy* deſtroy the roots of a weed torn up, and expoſed naked to the air many days (I might ſay weeks) ſooner, than a weed of the ſame ſpecies would be deſtroyed in *England* with the ſame treatment.

Theſe apprehenſions made me diffident in attempting to revive the practice of *harrowing lucerne*, in the manner the antient *Romans* harrowed it. A childiſh paſſage likewiſe in *Columella*, [b] and other huſbandmen among the antients, was another reaſon why I never ventured to make the experiment. "Let the teeth of your harrow," ſay they, "be made of wood, for iron is hurtful to lucerne."

[a] I cannot find that the old *Romans* ever ſowed lucerne with ſpring-corn (though their country was leſs weedy than ours (nor with lupines, vetches, fenugreek, ſweet melilot, *&c.*

[b] *De Re Ruſt.* Lib. ii. c. 11. See *Pliny*'s *Nat. Hiſt.* Lib. xviii. c. 16. And *Palladius* Lib. iii. tit. 6.

Nevertheleſs, I am informed, that an ingenious cultivator near *London* [c] has ventured upon an attempt which I had not courage to undertake, having *revived* this practice of the old *Romans* in our country, and, as I am told, with a good proſpect of ſucceſs.

Whether his method be the beſt and moſt efficacious way of managing lucerne is not the queſtion: The point I always wiſhed for was to enable the farmer, by any compendious method, to extract ſome profit from lucerne.

The practice revived by this cultivator, according to the accounts that have been given to me, is to allow five pounds of ſeed (when lucerne is ſown with barley) to an acre; and fourteen [d] pounds of ſeed,

[c] Mr. *Rocque.*

[d] The practice of the old *Romans* was to allow near 40 pounds of lucerne-ſeed to as much land as is equivalent to an *Engliſh* acre. The directions given are remarkable: *Ut ſinguli cyathi ſeminis locum occupent* X *pedum longum,* & V *latum.* And I am the rather inclined to think this computation of mine a juſt one, as we agree with them (the antients) in the quantities they preſcribed in ſowing wheat, barley, and peaſe.—*Agoſtino Gallo* tells us, about the year 1550, that the *Italians* allowed, in his time, *tre oncie per tavola:* And I believe he means three ounces Troy-weight. But, without inſiſting upon this particular, the *tavola* was a ſuperficial meaſurement of earth, eleven feet ſquare; ſo that a *tavola* and half make an *Engliſh* ſtatute-perch; and, of courſe, one of our acres requires about forty pounds weight of ſeed, or indeed more; for I have omitted the fraction of eighty ounces. See *Giornata ſeconda dell' Herba Medica,* 4°. p. 35.

The *French* throughout the whole laſt century (before that methods of drilling or tranſplanting lucerne were known) allowed about as much ſeed as the *Italians* to a piece of ground that correſponds with an *Engliſh* acre.

Now, if our country abounds with weeds more than *Italy*, or *France*, it ſeems natural to me, that we ought not to leſſen the quantity of ſeed ſown to a diminution of more than one half; and the reaſon aſſigned by the antients, for ſowing thick, appears to be a juſt one: *Opus eſt denſitate ſeminis (medicæ) omnia occupari, internaſcenteſque herbas excludi.* PLIN. *Hiſt. Nat.* Lib. xviii, c. 16.—The *Italian* author I have before cited is of the ſame opinion. If you ſow thick, ſays he, *non vi naſcono altre herbe, ſe non con difficultà.*

ſeed, if the lucerne be ſown alone. [Theſe allowances appear to me too ſcanty; nor can I ſee any reaſons for rejecting the practice of the old *Romans* in *one* part of the proceſs, and reviving it in *another*.]

In the ſecond year you are to mow it with all the graſs and weeds, and then harrow it with a ſtrong harrow, [d] as occaſion requires.

Whether ſuch an indiſcriminating purgation be equal to the exactneſs of horſe and hand hoeing, and whether it can, with common ſafety, pulverize the earth, and let in the influences of the atmoſphere to one third of the depth commonly attained in horſe-hoeing, digging, or by making uſe of the old *Engliſh hack*, the *Italian zappeta*, or the *three-pronged ſpade*—are points that ſhall be ſubmitted to better judges of agriculture than I can pretend to be.

That a common and moderate degree of harrowing may not *much* hurt *(untranſplanted)* lucerne, in the *ſecond* year, is a fact I have long known from experience. But violent harrowings (ſuch as ſeem to me ſufficient for the eradication of perennial weeds) muſt, in my opinion, maim a great many roots, and deſtroy others intirely.—If the reſult be contrary to what I apprehend in the preſent inſtance (for I approve not the practice even in *Italy)* it is the only example I know in agriculture, where confuſion is the mother of order, and ſlight deſultory labours get the better of patient and induſtrious ones.

I have already allowed, and ſtill freely allow, that lateral or horizontal roots (which will be of an in-

[d] As Mr. *Rocque* has not favoured us with a print of his harrow, it ſeems to me, that no inſtrument will anſwer the purpoſe of an *harrowing-rake* better than one formed upon the principle of M. *Vanduffel's drill-rake:* (See a drawing of it in SECTION XXIX.) Becauſe the handles which the harrower holds, in the manner of a ploughman, will enable him to inforce or leſſen the preſſure, as he may find it neceſſary, every moment.

conſiderable ſize in lucerne, whoſe tap-root has not been ſhortened by clipping) will ſend forth freſh ſide-fibres, when the former ones have been torn, or broken off, except the violence be over-great.

A few years will ſhew how far this operation may be attended with ſucceſs in *England*. After the *third* year, I have new apprehenſions of danger, which ariſe more from the bruiſing and trampling of the horſes feet, than from the harrowing. For, when the bulb at the crown of the root is formed into a conſiderable ſize, and maſhed by the heavy tread of labouring cattle, I think the crop will ſuffer extremely. If it does not, then all writers who have treated on lucerne have been in an error, for 1700 years and upwards: For they allow no large cattle, for this very reaſon, to graze a lucerne-field (where the preſſure of their feet is leſs violent than in the act of harrowing) and aſſert alſo, that ſheep ruin the crop by biting the part of the bulb above ground too cloſe.—It is much ſafer, as I have found by experience, to wound a root of lucerne below the bulb, than to bruiſe and maſh the bulb: The *former* may re-appear and come to good perfection in the ſpace of twelve months, but the bruiſed maſs of the *latter* remains on the top of the plant and putrifies; not to mention the water that lodges in its cavities. This may be partly ſeen in turnip-fields, when the bulbs are nibbled or ſcooped by ſheep.

Having delivered my ſentiments thus far on the *revived method* of cultivating lucerne near *London*, the reader, according to his own judgment, may make choice of *harrowing his crops*, *ſown promiſcuouſly*; or *drilling*, or *tranſplanting* them. But, as I have obſerved before, far from drawing huſbandry-concluſions from *Italy* to *England*, I am, in part, convinced that we cannot, in another ſenſe, argue quite ſafely from the diſtrict of ten miles round *London* (for in that diſtrict Mr. *Rocque*'s experiment

is

is made) to the remote counties of *England:* Firſt, becauſe the beſt cultivators will be always near the metropolis; and, ſecondly, becauſe manures may be procured from thence on eaſy terms, and in great abundance. So that there may be almoſt as much difference between the meliorated ſoil round the capital, and that of counties remote from it, as between a field in the country and a country-garden: Or, to ſpeak more properly, between the nature and ſoil of a common *Italian* field and an *Engliſh* field. Now, as my prime intention was to promote the culture of lucerne in every part of this kingdom and *Ireland*, it was on that account that I made my firſt experiments on *very middling ground*, merely through choice.

I ſhall add, in the next place, that, if from the univerſal conſent of all *good* husbandmen, for 1700 years paſt, it has been thought neceſſary to allow *about* forty pounds of lucerne-ſeed, at a medium, to every acre raiſed by broad-caſt ſowing, are not five pounds of ſeed too ſmall a quantity, when the lucerne is ſown with barley; or fourteen pounds, when it is ſown alone?

I will not pretend to ſay, but that all husbandmen may have been in an error about the quantity of lucerne-ſeed to be ſown on an acre by broad-caſt ſowing, from the times of *Columella* to the preſent hour. Such a ſeries of miſtakes, in matter of fact, is *poſſible*, but not *very probable*.—If five pounds, or even fourteen pounds, are ſufficient for ſowing an acre of lucerne (the firſt *with*, and the ſecond *without* ſpring-corn intermixed, in the common manner of promiſcuous ſowing) I then retract all that I have advanced upon this article; *totum hoc indictum volo*. But till theſe aſſertions are fully *verified* by *matter of fact*, as well as *continuance of the crop* (and the rather, as *England* requires, on *many accounts*, *more* ſeed-lucerne than *France* or *Italy*) I ſhall prudentially make

make it my choice to adhere to the party of *Virgil*, *Columella*, *Palladius*, *Gallo*, *Hartlib*, and *Du Hamel*, who bear witneſs to their own experience, and that of their co-temporaries, for ſeventeen centuries, without *oppoſition*. Through diffidence of my own ſtrength, I have taken poſt in the rear of the engagement, and, when once my principal chieftains are routed, it will then be time enough to ſurrender at diſcretion, and take care of my own ſafety.

But, to put the matter ſtill farther out of diſpute, M. *du Hamel*, in his *Elements of Agriculture*, (which work may be looked upon as the reſult of all his experiments) requires more ſeed for ſowing an acre the broad-caſt way than even the antients did. "The husbandman in *France*," ſays he, "if he ſows lucerne *alone*, allots a pound of ſeed to every perch." [The perch he here ſpeaks of is twenty-two feet ſquare, and an hundred of them make an acre.] And from the ſame paſſage I conclude, that when *French* cultivators ſow this ſeed with ſpring-corn (or vetches, as was once their cuſtom) they allow near one half of the quantity abovementioned. It is true, they raiſe the ſeed themſelves, or buy it at about three pence a pound; whereas, here, we are obliged to pay one ſhilling a pound.

Whoever conſiders this account laid down by the lateſt, as well as one of the moſt judicious writers on husbandry, will, I think, be inclined (and particularly with reſpect to the continuance of his crops) to prefer *tranſplanting* to *random ſowing*. For if, in the *latter* caſe, the ſeed-lucerne will coſt four pounds *per* acre, and in the *former* only eight or nine ſhillings; (the charges of *labour*, on one hand, being balanced againſt the charges for ſeed on the other) it appears, that the expences, either way, will be much the ſame; and ſurely no good cultivator will refuſe

refuſe to give his aſſent on the ſide of accuracy, cleanlineſs, and allowance of free ſpace for the roots to expand in. Nay, I think, he will not with-hold his approbation, if only *Hartlib*'s [4] and the antients forty-five pounds of ſeed are requiſite for ſowing an acre broad-caſt way, and not eighty or ninety pounds, which quantity comes nearly to M. *du Hamel*'s allowance for an *Engliſh* ſtatute-acre.

Now, as I plainly foreſee, that *Engliſh* cultivators will hardly ever be induced to allow the quantity of ſeed which the *French* author recommends (notwithſtanding our farmers, in general, are much richer than theirs) I will make it my endeavour to qualify matters a little, and deſcend, as nearly as my experience in the culture of lucerne will give me leave, in order to accommodate things to the parſimony of our huſbandmen in this reſpect.

All the conceſſion, therefore, I ſhall make, is as follows: And it is the reſult of my own experience and obſervations, ſuch as they have been. Whoever propoſes to raiſe lucerne, with proſpect of ſucceſs, by promiſcuous broad-caſt ſowing, and without an intermixture of ſpring-corn (and here I am only ſpeaking upon the footing of husbandry at preſent) muſt allow, at leaſt, one pound of ſeed to every four perches, ſtatute-meaſure; which will amount to the proportion of forty pounds to each acre.

And here I no-ways take upon me to make emendations on M. *du Hamel*, whom I allow to be my ſuperior in every article of husbandry. But as I ſeem to foreknow, in part, that few, if any *Engliſh* farmers, will be prevailed upon to adopt the *French* practice, I have therefore ventured to diminiſh the quantity to as low a degree as I can poſſibly go, and preſerve, at the ſame time, any probability of ſucceſs. Nor ſhould I have hazarded one half of a ſhort paragraph upon the ſubject, if it had not been that

[4] See *Hartlib*'s account in the *Teſtimon.* p. 9.

that the price of each pound of lucerne-seed, in *England*, is three or four times more than it is in *France*. And this makes another argument in behalf of *transplanting* lucerne in *our* country.

As to the sufficiency of small quantities of seed for an acre of lucerne, I can only say, for my own part, that, in the year 1758, I gave an acre of land a winter's fallow. (I am here speaking, as is my intention in all general experiments, of land at a considerable distance from the metropolis, and of a common-rate quality.] I ploughed and harrowed the ground to an exquisite fineness: Burnt the couch-grass twice, and, in *April*, sowed six pounds of the smallest ray-grass, five pounds of *German* trefoil, and ten or twelve pounds of lucerne. I gave the field a slight mowing the first year, being afraid to graze it.[d] In *June*, the second year, I mowed it again, and raked off, as before, the produce of hay very carefully. By this time the weeds began to make a formidable appearance: And, as I observed, such a thinly dispersed crop of lucerne, with no prospect of increase, but rather diminution, I ordered the plants to be taken up with a field spade, and placed with other transplanted roots: Sowing ray-grass above ground, where the earth had been broken. Nor was there any reason to suspect the lucerne-seed, as a nursery was raised from it, at the same time the field was sown.

Two years before for the sake of encouraging farmers, I sowed lucerne with a crop of barley; but the event no-ways answered my expectations.

Upon the whole, whoever, in remote counties, where the land is poor, sows lucerne with a view of harrowing it, must chuse the deepest and best ground he has; let such ground be *rather* strong than light, and *a little* inclinable to moisture, instead of being over-dry.

But

[d] See COLUMELLA, Lib. ii. c. 18. p. 76. Edit. *Steph.* 8°.

But if people have a mind to make farther attempts towards raiſing lucerne by broad-caſt ſowing, without the danger of harrowing the grown plants, or the trouble of tranſplanting, horſe-hoeing, &c. permit me to run the riſque of offering a new method of huſbandry. It is true, I never made the experiment myſelf, being contented to procure lucerne (as Providence ſeems to ordain) with *ſome* care, as well as *ſome* labour.

Inſtead of ſowing lucerne with *barley*, ſow it with *panic-graſs*:[a] But be careful to chuſe ſuch ground as is adapted to the nature of the laſt-named plant, and not unfavourable to lucerne: For example, clean, ſound land, but not wet.

Panic-graſs ſeems preferable to barley in many particulars. It will be *mown with the lucerne-crop in July*,[b] and will riſe no more, in ſuch manner as to do harm. The herbage it produces (eſpecially when the ſhoots are young) is very agreeable to cattle. But barley ſtays too long in the ground; ſo that not only annual, but many perennial weeds have time to ripen their ſeeds and ſtock the field. The ſhade and drip of it, towards autumn, are very hurtful to the lucerne underneath: And from the time the barley-ſeeds are forming, till the time of their maturity, the roots ſuck a double proportion of nouriſhment from the ſoil. All which is prevented by mowing the panic-graſs and lucerne in ſeaſon; nor will there be any trampling and carting at harveſt to bruiſe the young lucerne. As to loſing a crop of barley, it is only arguing from miſtaken œconomy.

[a] One of the beſt ſorts of panic-graſs-ſeeds, for this purpoſe, may be procured from *Breſcia*, in *Italy*, by the name of *panico*. We have a middling ſort of panic-graſs in *England*. Our anceſtors knew it, and called it *rye graſs (gramen ſecalinum)* not *ray-graſs*.

[b] This mowing will be but a ſmall one. It would ſeem more profitable to ſtay till the end of *Auguſt*, but, by that time, moſt of the weeds would have dropped their ſeed.

my. If the barley flouriſhes greatly, the lucerne is defrauded and half-ſtarved; if the lucerne be predominant (which is rarely the caſe) then the barley, all things conſidered, will little more than defray the expence of ſeed, *&c.*

Having given an acre of land a ſummer's fallow, and ſtirred the ground by a ſecond ploughing before *Chriſtmas*, plough it again in ſpring, twice at leaſt, before the end of *March*, and harrow it thoroughly. Then ſow twenty pounds of lucerne-ſeed in a moiſt calm day, ſix or eight pounds of panic-graſs, and four pounds of red, perennial, *German* clover, vulgarly called marle-graſs. As the field ought to be pulverized to a great degree of fineneſs, and as the lucerne-ſeeds are buried or trampled too deep into the earth by horſe-harrowing, it will be better to order the field to be hand-raked, and the rather as the plat of ground is but ſmall. Mow the crop in *July*, and towards the end of *Auguſt*, if ſome ſtrong foul weeds appear here and there, let them be taken up carefully with a ſharp field-ſpade made on purpoſe. Much may be done by one man in a ſingle-day. Let him carry a few ounces of marle-graſs-ſeed in his pocket, and, when he has removed the weeds, and returned the broken earth, let him drop a few ſeeds on the naked place, and juſt flatten the ſurface with a ſlight motion of his foot, or the back-part of the *bit* of his ſpade.

Lucerne, thus managed, may laſt four years.

I might eaſily take the credit of this diſcovery to myſelf (as the writings of the author, who ſuggeſted the hint to me, are extremely ſcarce) but I think it more ingenuous and praiſe-worthy to acknowledge, that I owe the idea to that excellent practical huſbandman, *Agoſtino Gallo*. [b]

According to the beſt of my judgment, one very important concluſion may be drawn from what is here

[b] *Le Vinti Giornate dell' Agricultura*, 4°, 1569, p. 48.

here laid down; namely, *that whoever attempts to raiſe lucerne, with any crop of another ſpecies, by broad-caſt ſowing, muſt cultivate ſome vegetable with it, which will bear mowing by the middle of* July, *and before the weeds have dropped their ſeed.*

This (or ſomething upon *this principle)* is the only probable ſcheme I can recommend, on my own part, to common farmers for raiſing lucerne. The expence is ſmall, and the labour ſhort and eaſy. As to the ſucceſs, *videbunt poſteri.*

Laſtly, by way of concluding this ſection, and with regard to the revived method of harrowing lucerne, great thanks are undoubtedly due to Mr. *Rocque*, who is attempting, with equal ingenuity and diligence, to accommodate the culture of lucerne to the taſte (and I hope profit) of the common huſbandman. This has been my principal point of view in cultivating lucerne; but to my mortification be it ſaid (except there be any chance from the hint ſuggeſted by *Agoſtino Gallo)* I have never yet been able to reduce the management of this plant to any very cheap, eaſy, and compendious method.

SECT. XVII.

Of Lucerne-Hay, with Rules for making it, and preſerving it. A Carniolian *Hay-ſtack, or Hay-Barn for receiving it.*

THE *hay* of this plant is the moſt excellent of any ſort yet known, and uſually ſells in *France*, *Switzerland*, *Spain*, and *Italy*, at a much higher price than the beſt upland hay. Nor does the richneſs of ſuch delicious food (if taken with moderation) occaſion any diſorders in cattle; yet, in my opinion, it is too precious and valuable to be given conſtantly, or without mixture, even to favourite

vourite horſes. It might perhaps make them over-delicate in their choice of food, when they went from home, and hay of an inferior quality was offered to them.

It ſeems, therefore, moſt adviſable to preſerve a quantity of this hay for the refreſhment and better ſupport of *ſick* cattle; and another part, ſet aſide for more general uſes, may be cut into ſhort joints with a ſtraw-cutting engine, and mixed with common hay.

Cattle (perhaps no contemptible judges in their own ſenſe of taſting, and guided by the aſſiſtance of that ſagacity with which Providence has endued them) always prefer lucerne-hay to any other, if you lay different heaps before them: And of this I ſhall partly aſſign the reaſon in another place. [e] In proof of which aſſertion I will here add a ſhort example grounded upon my own experience: A weaning calf, about five weeks old, refuſed to drink her milk, nor could any art prevail on her to take it. Having confined her in a little ſtall, the firſt trial was made with ſmall fine ray-graſs hay and hop-trefoil, which had been cut young, and cured without receiving a drop of rain. This the ſagacious little creature refuſed. Then ſmall handfuls of lucerne-hay were faſtened to ſtrings, and hung up within her reach: Which, when left alone, ſhe began to taſte, and, continuing to eat thereof every day, never afterwards touched any more milk, but took to graſs very kindly.

Having mentioned the good œconomy of not giving lucerne-hay profuſely to cattle, it may be remarked occaſionally, that it is partly a cuſtom, in *Switzerland* and *France*, to give horſes in winter regular feeds of lucerne-hay cut ſmall, in order to ſupply the place of oats: And it is computed by Monſieur *de Chauteauvieux* in particular (who firſt ſub-

[e] See the 4th paragraph ſucceeding this.

ſubſtituted this *ſuccedaneum* inſtead of corn) that *two* pounds of chopped lucerne-hay are an equivalent for a quartern, or two quarts of oats. Indeed, we allow that two pounds of lucerne-hay, dried, weighed eight pounds, when the herbage was green. —Yet ſtill, if two pounds of lucerne-hay are equal in nouriſhment to a couple of quarts of oats, how are we to reconcile the practice of the old *Romans* to this calculation, who allowed 20lb. of the ſame hay, or what was tantamount to twenty quarts of oats, to a large working ox every night? [f] Either the allowance was a very generous one, and a very expenſive one for farmers; or 20lb. of lucerne-hay were not ſo full of virtue and nutriment as twenty quarts of oats.

I have thrice made lucerne into hay, in parts of *England* very remote one from another; and each time with ſucceſs; but my good fortune, as to weather, was accidental. For this reaſon I do not chuſe to eſtabliſh any general practice in huſbandry upon caſual ſucceſs; for our climate is neither hot nor dry enough to expect much uniform good luck from this ſort of hay-making; but, by calling in the aſſiſtances of art and prudence, we hope to counterbalance the inconveniencies of our climate, and ſhew that every induſtrious cultivator may either make lucerne-hay pure and unmixed in fine ſummers, or mixed by art in more difficult ſeaſons for hay-making, and yet anſwering the purpoſes of excellent fodder to our beſt cattle.

Thoſe who intend to cut one of their lucerne-crops for hay each year, [g] may, if they pleaſe, make a plantation with a principal eye to this purpoſe: In which caſe they muſt ſet the roots in double rows of three feet four inches diſtance, and an in-

A a terval

[f] VARRO *de Re Ruſt.* p. 23.

[g] To cut oftener than once a year, upon the ſame ground, would impoveriſh the ſoil, and weaken the roots too much.

terval of six feet between every two rows; in which large interval the hay is to be made: Which practice will not diminish the crop one fourth part so much as may be imagined. Others again, who may not chuse to take so much precaution, may convey the herbage, when cut, into some adjoining field that is bitten down pretty bare, [f] and there perform the work in the best manner they can.—In short, one of these two methods must be followed; for, if you attempt to make hay in a common lucerne plantation, the roots will send up fresh shoots in about forty-eight hours after cutting, and heavy juicy damp heaps lying thereon will blanch the new buds and stalks, and kill them soon.

Yet *two great difficulties* are still to be struggled with, namely, *the making lucerne into hay, and preserving it when made.* Many a good cultivator has been much distressed with the *facere* and *servare* [g], under this article. Nay, these difficulties increase upon the husbandman in a climate like *England*, where solar heat is wanted, at least for this purpose; not to mention the variable nature of the weather, and the abundance of rain which falls. I am therefore for attempting to make only a tun or two of this hay every summer, either to mix with common hay, or give it in small quantities to favourite horses (when they droop in their feeding) or sick sheep and cows; especially the latter, before and after their time of calving:—And tho' we can never produce such stocks of lucerne-hay as may be seen in drier and warmer countries, like *Italy* and the southern parts of *France*, yet there is no just cause for

[f] I once made lucerne-hay with great expedition, on a sunshiny gravel-walk; but the grit and sand mixed with it, and the rather, as there is a kind of gum in the juicy parts of lucerne, which renders it apt to adhere to whatever it touches, good or bad.

[g] HORAT. *Epist.*

for repining, when we reflect that *every tun* of lucerne hay weighed *four* tuns in green herbage; and ſomething like ſuch a decreaſe may be diſcovered in drying ſainfoin and clover.——However, except I greatly deceive myſelf, the remarks and directions I am going to lay down, will *alleviate* the difficulty above-mentioned, and perhaps in ſome fortunate ſummers *totally remove* them. But however, if the ſickneſs and pining away of cattle could be put out of the queſtion, it might be full as good œconomy to conſume the lucerne *green*, as to dry and keep it.

As lucerne is not only extremely *juicy*, but *that* juice is of a *viſcous* nature, it is extremely difficult (at leaſt in *England*) to dry it for hay: So that the moſt ſkilful cultivator, when he attempts this work, muſt ſacrifice in ſome degree to Fortune, or the *Bonus Eventus* of the antient *Roman* huſbandman. [b]

At the time of drying, this viſcidity rather *hardens*, than *evaporates*: Like gum-arabic water, or ſugar boiled up for candying;—and therefore a delicious flavour remains for cattle, after the herbage is dried.

If heavy rains of long continuance ſet in, immediately after the lucerne is cut, the leaves in a few days will turn white, which is no very promiſing proſpect; and, if ſtrong gleamy ſunſhine ſucceeds, the ſwarths muſt be turned very gently, or elſe the leaves will fall from the ſtalks. Something of this kind will alarm the huſbandman in the moſt favourable ſeaſons; and the ſame may be obſerved to a leſſer degree in making clover and ſainfoin hay. Therefore, when the lucerne herbage is almoſt half-dried and put into graſs-cocks, it will be proper not to turn thoſe cocks with a prong, careleſsly and haſtily, as in common hay-making: but order a couple of hay-makers to ſlide two thin ſtrips of a deal-

[b] Bonus eventus ruſticorum eſt deus. VARRO *de Re Ruſt.* lib. i. c. 1.

board under the cock, and turn it over bottom upwards with one gentle motion; and for the ſame reaſon, when theſe graſs-cocks are to be removed in order to form wind-cocks, it may be moſt adviſeable to carry them on a hand-barrow.

When lucerne receives its laſt drying in the field, being packed up in large wind-cocks, I have found it no-ways improper to place an empty oſier-hamper (with the lid or cover faſtened) in the middle of the cock in one ſenſe, but nearer the bottom than the top in another ſenſe. Such a contrivance will in ſome meaſure anſwer the ends of a ventilator: and, when this hay is carried to the hay-barn hereafter deſcribed, place in the compartiments a layer of clean, dry, ſweet, wheaten ſtraw, and another layer of lucerne alternately, till the whole is filled. This will not only prevent the lucerne from heating, but augment the quantity of forage: Beſides, the ſtraw will imbibe a fragrancy and moiſture from the lucerne, and cattle will eat them mixed together with great pleaſure: [e] And, if an horſe or cow be very ſick, it will be eaſy to pick out any proper quantity of pure unmixed lucerne-hay for them.

It may be obſerved farther under *this important article*, that, by intermixing alternately layers of ſtraw and layers of lucerne, there will be no need of giving lucerne ſo much drying in the field, as might be requiſite otherwiſe, and which can be ſeldom brought about effectually in our climate, except in ſome particular ſummers.

Yet ſtill it muſt be remembered, that even when *this mixt lucerne-hay* comes to be ſtacked, it may be prudent not to make it into a rick according to the common cuſtom, but protect it in a manner as ſhall be hereafter deſcribed.

A greater

[e] *Bellingham Boyle*, Eſq; in his account communicated to the author, has comprehended the uſe of this expedient extremely well.

A greater difficulty yet remains, which is to preſerve the pure lucerne-hay, that is unmixed with wheaten ſtraw. It is eaſy to imagine, at firſt ſight, that this hay is too delicate to bear being expoſed to rains and winds in the open air; beſides, the leaves of it are too brittle to bear ſtowing ſo cloſe in the ſtack, as common hay is uſually ſtowed; and conſequently it will be found troubleſome, if not impracticable, to make any thatch lie cloſe upon it. Hence it appears neceſſary that lucerne-hay muſt be *houſed* in ſome ſhape or other: And then it may keep good for ſome conſiderable time. [c] But the misfortune is, that few people have room to ſpare, or ſweet, wholeſome, proper places for ſuch purpoſes: As lucerne-hay ought not to be ſtowed in our common barns, where damp floors and earthern walls might taint it, and abundance of duſt, cobwebs, and filth of all kinds fall from the thatch. On the contrary, it ſhould touch nothing but clean boards, and receive the influences of the air with as little rain as poſſible.

This being premiſed, perhaps the following ſcheme of erecting a receptacle for lucerne-hay may prove, upon the whole, no bad expedient; and I the rather mention it, as ſuch a cheap, ſlight, commodious ſtructure is no where made uſe of, but in one ſolitary unfrequented part of *Europe*.

What I mean is a little extemporary kind of edifice made uſe of by *Carniolian* huſbandmen, being invented by them for better ſecuring corn and airing it, or preſerving the hay of curious tender graſſes. There is ſomething in the idea which ſeems to deſerve a tranſient notice at leaſt, as may appear by examining the following drawings made in *Carniola*, in the year 1749.

[c] Lucerne-hay, if rightly houſed, will keep extremely well for three years. *Culture des Terres.* Tom. v. p. 529.

The Front and Back Proſpect of a CARNIOLIAN *Hay-ſtack*, or *Corn-ſtack*.

The frame of wood-work is weather-boarded at top (the boards over-lapping) and the eaves project, but not much. This little ſtructure is twenty-one feet high from the undermoſt floor, a. a. to the hanging over of the roof, b. b. the length of the fore and backfront (if ſuch an expreſſion may be made uſe of) is thirty-two feet, and the meaſure of each compartiment, c. c. (there being twenty-four in all) is eight feet in breadth, and ſeven high; which, by the way, our wood-cutter has not repreſented ſo exactly as it might have been done. The projecting ledges of the two middle-rows, marked d. d. are fixed on or taken off occaſionally. The poſts, or ſupporting pillars, e. e. (which ſerve alſo for ſtaddles) are three feet high, before you come to the ſtack. Every thing is the ſame in the fore and back front.

The

The Side-View.

This print repreſents the ſides of the ſame hay-ſtack, weather-boarded, and each board lapping over as in the roof. Theſe ſides are of the ſame height with the front, and ſixteen feet wide, with one upright boarded partition in the middle, as the letter f. which runs from end to end, dividing the cells into twelve and twelve, of the ſame dimenſions in every reſpect.

Nor may it be amiſs to apprize every perſon who erects a little ſtructure of this kind, that great care muſt be taken in forming a ſtrong fence or paliſado round it, which may be of an oval figure, as beſt agreeing with the ground-plot of the hay-ſtack, which is an oblong ſquare. In the front-part of this fence muſt be a five-barred gate for carts to enter. Such an hay-ſtack may be placed in any little meadow near the ſtables.

It may alſo be obſerved, in the ſecond place, that, though *M. du Hamel* aſſures us [b], that lucerne-hay, rightly made and houſed, will continue good for three years, yet I am not ſure that this may be

[b] See the note to page 159.

asserted confidently with regard to lucerne-hay cured and housed in *England*. Nor is there much need of keeping the aforesaid hay after the spring-cutting of green fodder begins, except in small quantities for sick cattle.

I thought proper to make this short remark, by way of precaution: Leaving people at the same time to use their own discretion, gratify their own fancies, and consult their own convenience.

When the *Carniolian* husbandman wants hay or corn, he empties the lowermost cells of the stack first; and by so doing all inconveniencies from rain are avoided. If the said stack consists half, or intirely of corn, he sets traps in the emptied cells to catch rats, mice, *&c.* but, before that time, if he suspects that these vermin have begun to commit their depredations, he thrusts a small truncheon of young willow into each compartiment or division where the corn is stowed, and, if the rind be gnawn and pilled, he takes the corn out in a fine day, and then replaces it, after having destroyed the vermin.

Little can be objected to this hay-stack but the expence of erecting it; and that objection will in a great measure vanish, if people can cut coarse timber from their own estate; for the workmanship will be rough and ordinary, and the whole frame-work after standing twenty years (which it will certainly do, if the outside and more exposed parts thereof are painted) will afford sound materials sufficient to erect an extemporary shed in the fields for grazing cattle: At the same time those who are desirous to save timber, may make a vacancy of five inches breadth between each plank or board, either in the floors or upright partitions; nor will corn or hay squeeze through such a narrow space.

The said stack or rick will contain about six tuns of hay, of which, when you carry it into the stable, take always one compartiment or division at a time,

Such

Such perſons as have not lucerne-hay enough, may fill one ſide with wheat, making the bottom of the ſheaves front the weather.

SECT. XVIII.

A Digreſſion, wherein it is ſhewn, that many good practices in Agriculture may be borrowed from Nations whom we look upon as quite ignorant in Matters of Huſbandry.——Exemplified in Harrowing, Covering Seeds, Breaking and Dividing the Earth, &c.

THE reader may ſmile to ſee any thing that is borrowed from *Carniolians* [d], or *Croatians*, *&c.* recommended to the imitation of the more intelligent *Engliſh*; but there is hardly a country, how unſkilful ſoever the inhabitants may be, but ſomething may be gained, by attentively obſerving their methods of working. Thus the mines of *Miſnia*, *Hungary*, and *Idria*, are, in many inſtances, carried on more dextrouſly and expeditiouſly than in kingdoms famous for mathematics and mechanics; and, perhaps, as many efficacious medicines have been learnt from the unenlightened *Indians*, as from *Theophraſtus* and *Meſva*.

It were to be wiſhed therefore, that nations, which value themſelves upon their ſkill in agriculture, would not deſpiſe ſome practices of huſbandry in countries leſs famous in that reſpect than their own. For there are marks of genius and ſagacity in people, not renowned for their good management in cultivating the earth. Modeſty and docility will never miſbecome the moſt knowing practitioners.—And thus

[d] I remember to have ſeen another inſtance of ingenuity in the inhabitants of *Carniola*: They conſtruct a corn-mill upon rafts, or two large flat-bottomed boats, to which mill is added a ſmall weather boarded dwelling-houſe: And thus the miller aſcends or deſcends the river, working, as he pleaſes, ſometimes near one town (ſituated on the banks of the ſtream) and ſometimes near another town.

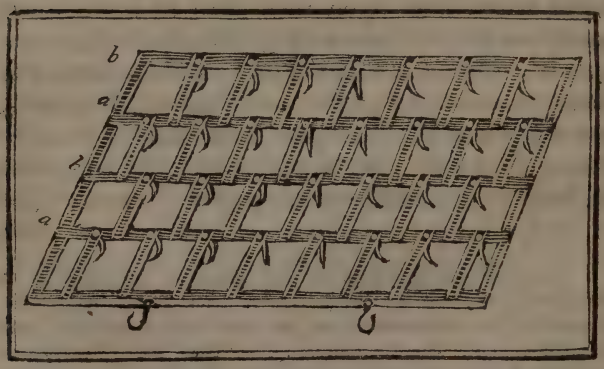
thus the circumſtance, which chiefly raiſed the *Romans* to the ſovereignty of the world, was their laying aſide their own cuſtoms, as ſoon as they met with better among the people they conquered.

Thus, in a word, no ſmall matters may be gathered in huſbandry from nations ſeemingly buried in ignorance: And as continually dividing the earth, keeping it free from weeds, and a dextrous method of covering curious ſeeds when ſown, conſtitute the principal part of this little ſyſtem of huſbandry; I ſhall beg leave to make a digreſſion on the ſubject, which I hope will not prove unpleaſing or unuſeful: Bearing ſtill in my memory the remark of *Columella*, namely, [c] that every country, in this, as well as other particulars, may impart ſome lights to the moſt ingenious husbandman: And, for this reaſon, I ſhall juſt ſketch out the figure of a *Swediſh* harrow, made uſe of even on the borders of *Lapland*.

A SWEDISH HARROW,

(The under-part turned uppermoſt.) To be drawn by two or four horſes, in proportion to the reſiſtance and ſtiffneſs of the ſoil.

From

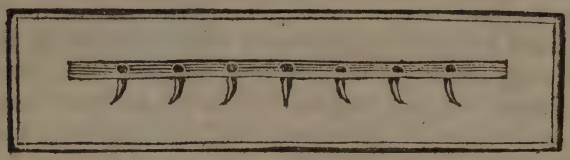


[c] There is no country where there are ſuch ill huſbandmen, but, in ſome particular or other, they excel. HARTLIB's *Legacy*, p. 78.

From the bare aſpect of this harrow and the configuration of its teeth, or tines, we may eaſily judge how it ſtirs and cleanſes the ground: But in this operation care muſt always be taken to draw it ſtraight along the field firſt, and then croſs-wiſe; which may be repeated as occaſion ſhall require.

The *teeth* of the *Swediſh* harrow in the rows, *a. a.*

The teeth in the rows, *b. b.*



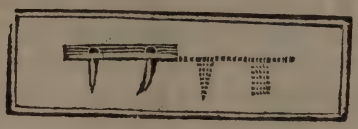
The teeth or tines of this harrow are larger, ſtronger, and take deeper effect than thoſe of the *Engliſh* harrow, and ſtand as here deſcribed in the rows marked *a. a.* being eight in number, and only ſeven in the rows *b. b.*

This inſtrument is drawn ſtraight forwards in a natural manner, the horſes being fixed to a couple of hooks, repreſented in figure the firſt, which are the two central points unto which the traces ought to be faſtened. And hence it is, that the *Swediſh* harrow lies flat, and cuts more evenly than the *Engliſh* one, as the equality of preſſure is better preſerved, and the teeth ſucceed each other in alternate lines.

Again, the different effects which ariſe from the manner, whereby the teeth of the *Swediſh* harrow perform

Nulla regia non aliquid affert quod ad lucubrationem confici poſſit. COLUMELLA, Lib. xi. p. 387.

perform their work, may be fully comprehended, by conſidering the ſlight ſketch which follows:



You here ſee, by the dotted points, that ſtraight teeth or tines [e] pulverize a cone of earth, and curved teeth pulverize an oblong ſquare.—And thus curved tines turn, diſturb, and break to pieces one third more ground than *ſtraight* ones; and ſtill with greater ſucceſs, if they ſucceed each other in alternate lines, as the *Swediſh* tines do. They will alſo, like tooth-drawing irons, lay ſtronger hold on the roots of weeds, and better *cover* the grain that is ſown: Which our farmers allowed, upon examining the drawing above-given: "*Our* harrow," ſaid they, "moves the ſeed, but *this* covers it; a circumſtance in husbandry we always wanted, and lamented ſuch a want."

With them the experienced *du Hamel* agrees exactly in his laſt work. "The great uſe of harrows," obſerves he, "beſides tearing up weeds, and breaking the clods, is to cover the ſeeds well." [f]

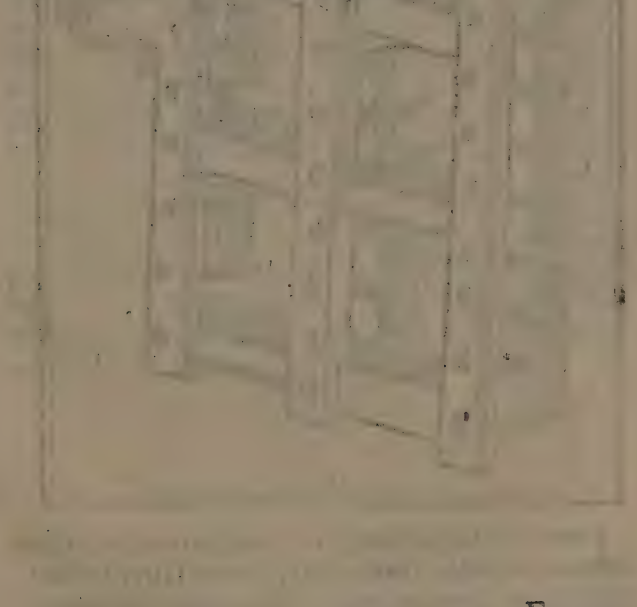
Having thus fully conſidered the *Swediſh* harrow, I cannot help thinking on the occaſion, that, remote as *Sweden* may lie from *Italy*, the idea of the *Swediſh* harrow was firſt taken from the *Italians*, who revived husbandry about 200 years ago, and upwards: For which I can aſſign no other reaſon, but that the actual peruſal of *Virgil*'s *Georgics* in ſome, and the traditional memory of them in others, made the inhabitants of that country (*Italy*) extremely ambitious

[e] The cutter, in this repreſentation, ſhould have made the tine on the left hand intirely ſtraight.

[f] *Traité de la Culture de Terres.* Tom. I. p. 376. Tom. VI. p. 376

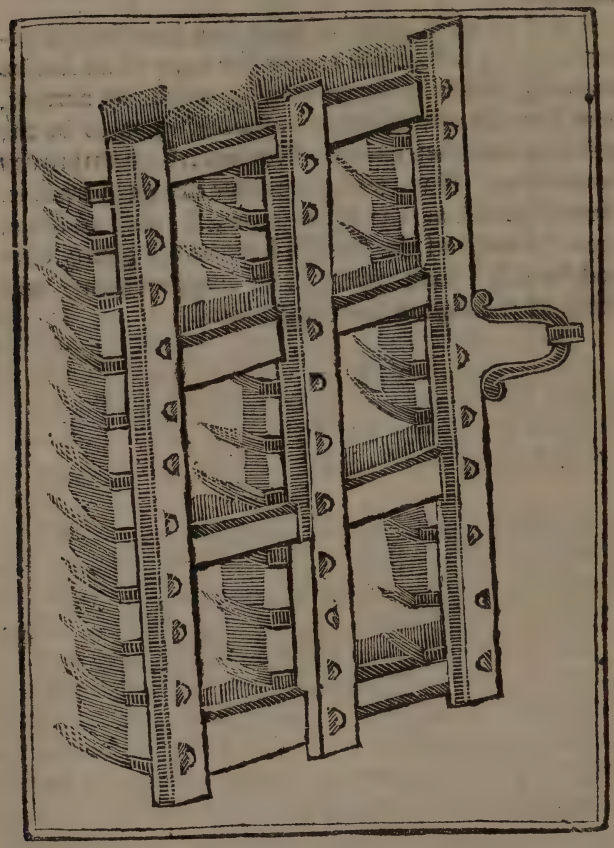
ambitious to take the lead in matters of husbandry; but that ambition, alas, is forcibly extinguiſhed, and now no more! The preſent laws and practice of the country ſeem to be calculated againſt agriculture; which (as *Auguſtus* ſaid of *Haterius*) *ſufflaminanda eſt.*

I will now, in proof of what has been before remarked, lay before the reader the copy of an *Italian* drawing, made in the year 1569, when the harrow, here beneath exhibited, was looked upon to be the beſt that was then extant: Nor has it been improved ſince by us. Nay, we have rather departed from it. Nevertheleſs, at the ſame time, I muſt obſerve, that the teeth of the *Swediſh* harrow are gently curved (which I look upon as an improvement) and thoſe of the *Roman* one are ſtraight.



ERPICE

ERPICE *in Opera:*
OR
An ITALIAN Harrow at Work.



From this ſlight ſketch exemplified only by a few inſtances ſelected from many, it may fairly be concluded, that the man deſerves ſome public encouragement who ſhall find out a better expedient for ſecurely covering ſeeds, than the common method of har-

harrowing can afford us at preſent; and that not only in regard to the attacks of living creatures, but the inclemency and other injuries of weather.

Nevertheleſs, our common harrow has its uſe in two inſtances, namely, in clearing couch-graſs and ſtubble from the new-ploughed earth; for by jumping and tottering along it frees itſelf from the incumbrance of trumpery, which would otherwiſe choak the teeth, and render the draught more difficult. The weeds and ſtubble being burnt, then the *Swediſh* harrow may give the finiſhing.

The *Engliſh* husbandman perceives, in part, ſome inconvenience in the common conſtruction of harrows, and therefore (that each row of tines may not follow the firſt leading tines) drags the machine tranſverſly, by fixing the drawing-part at one of the corners of a ſort of ſquare, which is unnatural, as it diſpoſes the frame-work to waver and jump by ſtarts from the ground: Nor does he, by making uſe of this expedient, diverſify the lines of the teeth ſo much as may be imagined. So that, upon the whole, it is a modern attempt to rectify one error by committing a ſecond: For I have the draft of an harrow by me, uſed in the year 1669, copied from a ſketch made by *William Sherwyn*, a diſciple of *Hollar*, where the inſtrument moves ſtraight forwards, and the traces are fixed at each end, ſomething like what may be obſerved in the *Swediſh* harrow.

An *Engliſh* HARROW, in the year 1669.

That we may draw towards a concluſion of this article, the harrow, uſed in *France*, deſerves ſome notice.

A *French* HARROW.

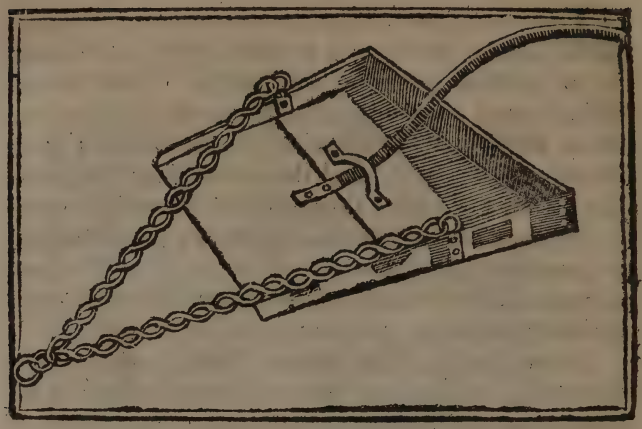
Again, the *Chineſe* have an harrow with handles like a plough, which, when the horſe or horſes draw it, is kept down firm to the ground by the perſon who guides it, in proportion as need requires.

The

The idea of an husbandry-inſtrument of ſuch an uſeful nature deſerves to be thoroughly conſidered by all perſons ſkilful in mechanics.[f] For the inſtability and jumping of the *European* harrow (and of the *Engliſh* harrow eſpecially) renders it in a great meaſure ineffectual; and the remedying this deficiency, by laying one ſluggiſh uniform weight upon it, ſeems to ſavour a little of barbarity; whereas the *Oriental* method has an air of dexterity and convenience, as the preſſure may be increaſed or lightened every moment, juſt as appears to be requiſite.

As the preſent Eſſay relates chiefly to the culture of graſſes, and as the ſeeds of them require to be covered more lightly and elegantly than thoſe of corn, let it be permitted me to add another improvement, which (ſo far as I can learn) never made its appearance in *England*, and poſſibly is forgotten even in *Italy*, where it took its riſe. This husbandry-inſtrument, called, by the *Italians*, *traina*, was a ſort of *drag* intended to level the broken ſurface of the ground, and cover the footſteps of the horſes or oxen after harrowing. No invention of this nature can be more ſimple in its conſtruction, or more uſeful in its effects: Of courſe, I feel no ſmall pleaſure in giving an exact repreſentation of it, copied from the ſame authority I have mentioned before.

[f] The Sieur *Guerin*, a bookſeller at *Paris*, has a *Chineſe* drawing of this harrow.



The *Italian* TRAINA, or *Drag*, for ſmoothing the ſurface of the ground after common ploughing and harrowing, or for covering ſmall ſeeds.

This operation is of the utmoſt conſequence, after ſowing common graſs-ſeeds, where the leaſt eminence, or depreſſure of the ground in holes, perplexes the labourer at mowing-time, and is prejudicial to the crop: For graſs, that is not cut low, never thrives.

We ſhall obſerve, in the laſt place, under this article of cleanſing and pulverizing the ground, that it was an invariable rule, amongſt the antient *Romans*, when they broke up foul lands, to deſtroy, as nearly as poſſible, every weed; ſo that (to uſe their own phraſe) there wanted little or no *occation*, when the ſeed was ſown: Reſolvatur terra in pulverem, ut vel nullam, vel exiguam deſideret *occationem* cum ſeminaverimus[g]. *Occation* was breaking

[g] *Columella De Re Ruſt.* Lib. ii. c. 4. *Varro* has given us a clear ſhort definition of *occation*: Occare eſt comminuere, ne ſit *gleba*." *De Re Ruſt.* Lib. i. c. 31. In which ſenſe *Horace* uſes

ing the lumps of earth into ſmall pieces, either with harrows, [e] or hurdles, [f] (made to anſwer the purpoſes of a light harrow, like our buſh-harrow) or with an inſtrument of husbandry, called the *bident*, which reſembled, in ſome degree, *Lawſon*'s *ſcrape-all*, above deſcribed, or *what* our farmers call a *drag:* For it broke and tore the ſurface of the ground near the roots of plants, where the plough could not approach with ſafety.

This inſtrument was uſed by the antients in a double capacity; for, if it did not diſunite the clods by tearing, then the workman turned the head of it, and, with a ſmart blow, beat the ſtubborn lumps to pieces. Hence *Virgil* ſays:

uſes the laſt mentioned word, when he ſpeaks of foul, coarſe, graſſy clods and lumps of earth:

Rident vicini *glebas* & ſaxa moventem.

[e] ——— *Raſtris* glebas qui frangit inertes.
Virg. Georg. I. v. 94.

The *raſtrum* of the antients ſignified an *harrow*, and rarely, if ever, a *rake*, as we tranſlate it. It denoted uſually an *heavy* harrow, in contradiſtinction to the lighter ſort next mentioned, called *crates*. Thus

———*Iniquo pondere raſtri*. *Ibid.* v. 164.

And *Columella* ſays, ſpeaking of foul, coarſe, ſtrong land,

Tu gravibus raſtris cunctantia perfode terga.
De Hortis, Lib. x.

Crates.

Virgea præterea Celei, viliſque ſupellex,
Arbuteæ crates.
Georg. I. v. 165.

As alſo *vimineæ crates, ſalignæ crates*, in the ſame author; and metaphorically, *crates favorum, crates pectoris*. *Ibid.*

——duros *jactare* bidentes [e].

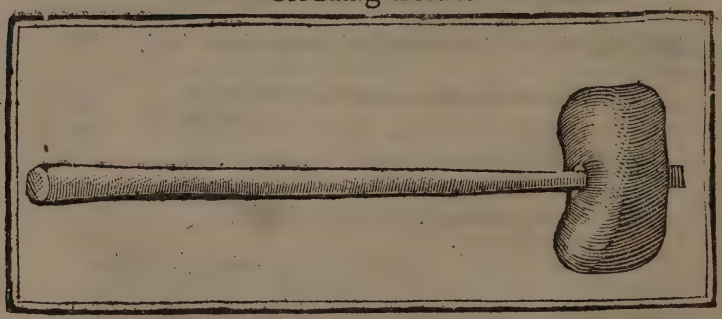
(To break the clods to pieces with a ſtroke of the hard, i. e. *iron-headed, bident.)* And in another place:

——glebaque *verſis*
Æternùm *frangenda* bidentibus [f].

(The earth muſt be broken perpetually with a blow of the bident, turning the drag-part uppermoſt.)—Our *Engliſh* farmers, as long ago as in the reign of Queen *Eliſabeth*, diſcovered the prudent intention of the *Roman* husbandmen; and, upon theſe occaſions, called in the aſſiſtance of a more convenient utenſil, namely, the *maul*, or *clodding-beetle*, which I have myſelf ſeen uſed in ſome parts of *England*, and particularly in *Somerſetſhire*, and the *Vale of White-Horſe* in *Berkſhire*, where the operation is called *hill-beetling*.

It may be perceived at firſt ſight, *where* ſuch an inſtrument is moſtly wanted: Namely, in ſtiff, clayey grounds, after ſowing the ſeed and harrowing.

The old *Engliſh* MAUL,
OR
Clodding-Beetle.

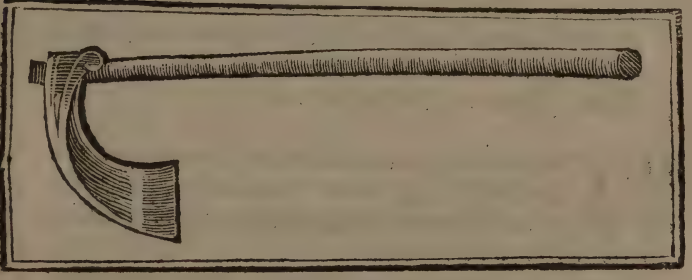


Beſides

[e] Georg. II. v. 355.
[f] Georg. Ibid. v. 399.

Beſides *this* there was another antient inſtrument of *Engliſh* husbandry, called the *hack*; which anſwered many good purpoſes, with notable riddance and expedition.

The old *Engliſh* HACK.



This inſtrument (particularly in ſtiff, clayey lands, where the roots of weeds and graſs bind and knit together) was uſed, immediately after every ploughing, to ſupply, by hacking, the defects in furrows and head-lands, where the ſhare had not cut ſufficiently deep, or the ploughman, through negligence, aukwardneſs, or accident, had left green ſtrips of ſod untouched. As therefore the *hack* was generally uſed after ploughing, ſo the aſſiſtance of the *clodding-beetle* was called in, when the harrowing was finiſhed: So great a regard had our forefathers to cleanlineſs in husbandry and a due pulverization of the ſoil!

Upon the whole, it were to be wiſhed, that theſe two old-faſhioned practices of husbandry were not ſo much diſcontinued amongſt us as they are at preſent: For we are too apt to fancy ourſelves wiſer than our predeceſſors, and that ſometimes without ſufficient foundation —It was this induced me to preſerve the memory of theſe two husbandry-inſtruments, by copying a couple of drafts of

hem, which were made in the former part of *Charles* the First's reign.

SECT. XIX.

Of Neatneſs in Huſbandry and Deſtroying Weeds in a Lucerne-plantation.—When to cut Lucerne for green Fodder.—The Author diſſuades the Cultivator from letting Lucerne ſtand for Seed, except in one Inſtance. —Foreign Seed recommended.—How to act, if the Plants flower in the Nurſery.

(1.) CLeanlineſs and deſtroying weeds are the uſeful elegance of husbandry, and old *De Serres* recommends ſuch practice, particularly in the culture of lucerne [f].

As to hand-weeding the rows, there are poor people enough to be found who may perform that work at a moderate price; and, with regard to hoeing and cultivating the intervals or ſpaces, we have ſpoken already of various inſtruments made uſe of for that purpoſe by the husbandmen of the laſt two centuries, as well as the preſent, in different parts of *Europe*.

In hand-hoeing, or horſe-hoeing between the rows, make it a point to ſet about deſtroying weeds in a *dry ſeaſon* only; and, if rain ſurprizes you during the attempt, let the weeds, already eradicated, be hand-raked between the rows, and carried to the compoſt-dunghil. Remember alſo particularly, when you order the plantation-hoe to be uſed the firſt

[f] As the paſſage is very remarkable, it may not be amiſs to tranſcribe the original words: "Curieuſement conviendra eſherber ou ſarcler la luzerniére en arrachant toutes les malignes herbes & plantes qui ſe feront fourrées, quant et les bonnes; & celà toutes heures qu'elles paroiſtront; de peur que par les temps devenües groſſes, l'on n' en puiſſe par apres deſengeancer le lieu, au detriment de la luzerne, qui ſe perd, ou s' abaſtardit, par le voiſinage d' autre herbage."

Theatr. d' Agricult. en folio, 1600, p 272.

firſt or ſecond year, that the labourer be charged to work ſo, that he never treads upon the weeds, after he has cut them up; for, in ſuch caſe, his trampling on them, in a wet ſeaſon, will fix them afreſh in the ground, where they will take root and ſpring again. *Depreſſa reſurgit* may be applied to a weed, as well as the palm-tree.

Upon the whole, it is impoſſible to recommend cleanlineſs and neatneſs (the characteriſtics of the *New Huſbandry*) with too much earneſtneſs.

Homer, ſpeaking of old *Laertes*, who was preparing to make a quick-ſet-hedge [o], takes notice, that his buſkins and hedging-gloves were compact and tight, though old and mended; by which little circumſtance, ſays an antient commentator, our poet (who exceeded all men in ſlight, but ſignificant, touches of the pencil) ſeems to inſinuate, that neatneſs, in matters of agriculture, is the firſt mark of a good husbandman.

And thus much for the encouragement of induſtry may be obſerved in general, that, though vegetables cultivated neatly, or according to the *new* husbandry, are not totally free from the injuries of weather, yet, upon the whole, they ſucceed better in unkindly ſeaſons, than thoſe which are cultivated the common way. This is ſpeaking without any enthuſiaſm, and even without partiality.

My other remarks, under this ſection, are as follow:

You may ſafely cut lucerne, when the ſtalks, at an average, are about ſixteen or eighteen inches high throughout the plantation, and when you diſcover that here and there a full-ſized, healthy plant puts forth its bloſſoms [p]: For nothing baulks or

[o] *Odyſſey* xxiv.

[p] Sickly, ſtunted plants ſometimes blow prematurely, eſpecially after the roots have been removed by tranſplantation. Therefore care muſt be taken to pay no regard to ſuch ſort of flowering.

checks the growth of lucerne more, than omitting to cut it at a right age.

Nor need you give yourſelf much anxiety about preſerving the ſeeds; nevertheleſs, for the ſake of gratifying thoſe that are curious in huſbandry, we ſhall, in due time and proper place, take the whole of that proceſs into conſideration. My reaſons for not being over ſollicitous on that head are as follow: (1°.) The ſuffering plants to form and ripen their ſeeds will always impoveriſh their roots, and of courſe diminiſh their future production.

(2°.) Never permit a lucerne-crop to ſtand for ſeed, except it be the laſt year you intend to continue it, and propoſe either to new-plant the ſame ground with lucerne (forming the rows of this ſecond plantation in what was the intervals of the preceding one) or deſtine the ground in queſtion to receive wheat, or ſome other change of crop.

(3°.) Suppoſing you, or your neighbours, ſhould ſtand in want of lucerne-ſeed; yet, even then, ſo ſmall a quantity is neceſſary towards raiſing a ſeminary for one or two acres, according to the method here laid down, that, upon the whole, it ſeems moſt adviſable to have recourſe to the ſeedſman, who may afford you (if he be honeſt, and has good correſpondents abroad) the beſt foreign ſeeds at 12*d.* a lb.

(4°.) If love of gain be your motive, and you raiſe ſeed for ſale, (for the produce, from an acre well managed, may perhaps amount to the ſum of ſeven pounds in money) I will take the liberty to ſuggeſt one little query partly founded upon my own experience; which is, that probably one half of ſuch ſeed (at leaſt in *our* climate) will not vegetate, when it is ſown, for a plain reaſon, becauſe it never came to a proper degree of maturity: For we want that ſtrength of ſunſhine and conſtant ſettled weather which the cultivators of lucerne enjoy

in

in *France*, *Spain*, *Switzerland*, and *Italy*; ſince it is neceſſary, that not only the grain, but the pod or huſk ſhould be ripened thoroughly; for, if the latter be green and damp, it will taint the former, before you can diſcharge the ſeed from the husk.

(5°.) It may be remarked farther, that the nature of our weather in *England* is ſo variable, and our warm, ſunſhiny days ſo few and caſual, that a crop of lucerne-ſeed will never be *all ripe*, or two thirds of it *nearly ripe*, *at the ſame time*. Perhaps, equal, uniform ripeneſs, throughout a whole ſeed-crop of lucerne, happens no where.—In this reſpect there is a *plus* and *minus* in all countries:—But ſuch good fortune is ten times, I may ſay twenty times, leſs likely to happen in *England* than in the warmer and leſs ſhowery countries abovementioned.

Laſtly, if the force of all that I have here remarked could be obviated or explained away, yet ſtill I ſhould adviſe the *Engliſh* cultivator to purchaſe his ſeed-lucerne from foreign countries; for, in husbandry, the benefit of changing ſeed from places at a remote diſtance is inconceivable!

We will now proceed to ſome other directions.

If the plants, in the ſeminary or nurſery, chance to blow by the beginning, middle, or end of *July*, cut them for green fodder as they ſtand: Not that ſuch cutting will be conſiderable enough in quantity to be any object of œconomy, but we rather adviſe it upon prudential reaſons: For the plants will be much weakened by flowering. *That* being over, you have then the power (according as ſhall be judged convenient) of tranſplanting the roots in *Auguſt*, or leaving them quiet in the ground without removing them, till the ſpring enſuing.

The ſmall matter of herbage you may happen to cut, upon this occaſion, will ſerve to give your cattle a foretaſte of what lucerne is; and the great

avidity,

avidity, with which they eat it, may help to animate the maſter in continuing his undertaking.

If the lucerne-plants happen to be of any tolerable ſize about the end of *October*, cut them carefully, notwithſtanding they are but eight or ten inches high, and though the advantage of ſuch green fodder be worth little or nothing: For it ſeems natural to conclude, that the drip and ſhade of the ſtalks will hurt the crown of the root in winter, as the leaves never periſh intirely in the ſevereſt weather.

We have made this experiment with good ſucceſs for five years one after another, yet no ways aſſert, that the plants would have ſuffered greatly, if the precaution had been omitted, becauſe we never ventured upon that trial.

SECT. XX.

Better to cut Lucerne with a Reap-hook than mow it. —The Beauty, Variety, and Uſe of a Lucerne-plantation.—Lucerne good for Sheep and Deer.

(1.) AFTER various obſervations founded on experience, it appears moſt adviſable to cut lucerne with a *reap-hook*, and not with a *ſcythe*: For a ſcythe, be the mower ever ſo careful, will frequently ſlice off ſuch parts of the bulb as ſtand above ground; in conſequence whereof, the root will weep, and the air and rain will cauſe it to periſh. Beſides, ſome weak and limber ſtalks will not ſtand firm to the ſtroke, but give way and riſe again; others will eſcape the ſcythe intirely, by trailing on the ſurface of the ground out of the mower's reach. Nor muſt we omit, that a ſtalk or ſtalks, uncut, hurt the future growth of the plant: For

For a branch, uncut, will ſend no freſh ſhoots from the buds in the crown of the root [d].

But cutting with a reap-hook gets the better of all inconveniences; for, as the ſtalks of moſt lucerne-plants can be graſped in one hand, ſo the reap-hook, in the other hand, performs the cutting part at once, and always avoids wounding the crown of the root. Nor is the operation tedious; for a boy may cut enough in an hour to feed four large horſes a whole day. This being done, nothing more remains, but to weigh a large oſier-baſket (ſomething like a chaff-basket) as alſo the quantity of herbage it will contain; or weigh the quantity that will fill a little cart made on purpoſe, till at length you bring your eye to a ſort of gage, and thus you will be enabled to give your cattle very nearly what you intend to give them: Since a ſmall matter, more one day and leſs another, will be of no conſequence to horſes or kine.

(2.) What *Virgil* ſays of a regular vineyard may be applied with equal propriety to a lucerne-plantation. No part of the *Georgics* is more exquiſitely heightened than the paſſage I here allude to:

Ut ſæpe ingenti bello cum longa cohortes
Explicuit legio, & campo ſtetit agmen aperto,
Directæque acies, ac late fluctuat omnis
Ære renidenti tellus, necdum horrida miſcet
Prælia, ſed dubius mediis Mars errat in armis;—
Omnia ſint paribus numero dimenſa viarum;
Non animum modo uti paſcat proſpectus inanem,
Sed quia *non aliter* vires dabit omnibus æquas
Terra, neque in vacuum poterunt ſe extendere rami.
Georg. II. v. 279.

The

[d] I have always had my eye upon this point, but never could obſerve that the ſtalks of lucerne made any ſhoots after cutting; but the bulb or crown of the plant grows larger, and puſhes forth new buds from the ſides, which become future ſtalks. Something of the ſame kind may be remarked in all graſſes.

The agreeable view of a lucerne plantation may be conſidered as matter of ſome pleaſure to every beholder; for the regularity of the rows, and the exactneſs of diſtance from plant to plant, amuſe the eye, as a work of induſtry. Beſides, what can diverſify and enliven a landſcape more, than to ſee a fine, thick, verdant graſs, when other graſs-fields are quite bare, or ruſſet-coloured?——It is ſomething alſo to behold, as it were, the returns of ſeveral ſprings in the ſame year.—To-day the field is cloathed with verdure: To-morrow it is cut and removed: In a fortnight more it appears in all the bloom of freſh vegetation, and in another fortnight arrives to maturity. Thus the picture changes almoſt every day: A variety and repetition of appearances rarely to be found even in the vegetable world!

It is thought, the expreſſion of *ver aſſiduum*, &c. which *Virgil* beſtows, by way of pre-eminence on *Italy*, alludes to the *frequent* crops of *medica* (i. e. lucerne) which made their appearance five or ſix times a year, when our author wrote.

The poet's words are as remarkable as any that are to be found in the *Georgics*; and their true meaning, at leaſt, ſeems to be preſerved in the tranſlation annexed:

Hic ver *aſſiduum*, atque *alienis meſſibus* æſtas [h].

Perpetual ſpring the face of nature wears;——
Harveſts of other months the ſummer bears.

I have elſewhere quoted the ſame circumſtance, but diverſified a little by *Claudian*. See SECT. I.

It is ſtill an higher ſatisfaction to reflect, that, if tranſplanted lucerne be found to anſwer, and is thoroughly encouraged amongſt us, the culture of it

[h] GEORG. II v. 149.

it will afford much employment to the infirmer poor, and to those who are too young, or too aged, to undertake any laborious work.

(3.) As lucerne ought never to be grazed, it is difficult to make many observations on it in regard to sheep; and the little that has occurred to us, worth notice, has been specified in the xiiith SECTION, p. 137. However, thus much is certain, *sheep* love it extremely, either green or dried into hay, and thrive wonderfully well, whenever they eat it.

At the same time it is to be regretted, that few or no experiments have been hitherto made on lucerne as a food for *deer*. For my own part, opportunities were wanting; and therefore it may be most prudent just to suggest the hint, and leave the matter to be farther inquired into by curious persons at their leisure and convenience. However, upon the whole, it is pretty certain, that, if lucerne be well managed, it will be fit to cut by the 10th of *April*; so that deer may be advanced in good plight, long before they can receive any considerable support from common grass. But, when you feed them, remember that the stalks, after cutting, should lie forty-eight hours in a dry, shady place, and then be given them in such a manner as directed concerning cows. SECT. xiii. p. 137.

As to young *swine*, no food is so healthy, no food so nourishing and agreeable, as the vegetable we are here speaking of; and that from the time they leave sucking, till they are put up for fatting: Before which time lucerne also has its use; for no sort of food enables the mother to give such large quantities of milk to her litter.—Here opens a considerable advantage to the industrious husbandman. Meanwhile common sense implies, that such lucerne must be cut up green, and carried to the stye.—The amazing growth of young pigs fed

with

with lucerne will give the farmer great hopes of ſucceſs and profit.

SECT. XXI.

Farther Directions about Tranſplanting.—The Hardineſs of Lucerne in bearing Cold.

WHEN you move lucerne roots for tranſplanting, though you dig but ten or fifteen inches deep, take care to give directions that the tap-roots be no-ways broken: And, if you hear the leaſt cracking or ſnapping, order the workman to be more careful; for the ſciſſars hurt not a tenth part ſo much as drawing up the roots with violence. When the plants are clipped, throw them into a large veſſel of water, though they remain there only an hour; for the ſun's heat cauſes them to droop and wither immediately: And yet this plant, of a contexture ſo delicate in its early days [i], having once acquired a certain degree of ſtrength and age, is able to bear the ſeverity of a *Swiſs* winter, where the winds and froſts are far more piercing than in our iſland. Hence alſo M. *du Hamel* tells us, "That, when the intenſe cold, in the year 1709, killed moſt of the olive-trees and walnut-trees in *France*, the lucerne received no damage deſerving notice; and, in the ſevere winter, 1755, when the thermometer of M. *Reaumur* ſhifted variouſly from eight to thirteen degrees above blank, and, on *February* 3, when a thermometer, expoſed to the open air, ſtood at ſixteen degrees,

[i] *Agoſtino Gallo* ſays, that the *breath* of cattle hurts young, growing lucerne, if they are allowed to graze it. This may be refining a good deal: But of ſo delicate a contexture is the plant here ſpoken of, that I have obſerved the leaves to droop and ſhrink, if handled much with the warm hand. And thus, if *Pliny* and the modern *Italians* may be believed, the annual trefoil (which is of the ſame genus with lucerne) gives marks of being a ſenſitive plant, upon the approach of violent rains.

grees, the lucerne at the ſame time ſuffered nothing."

Our *countryman*, *Tull*, (for there is a lover of husbandry of the ſame name frequently cited by *French* writers) has declared his ſentiments much to the ſame purpoſe as *M. du Hamel*.

"We need not, ſays he, much apprehend the danger of *Engliſh* winters, for lucerne will endure thoſe which are more rigorous. In the principality of *Neufchatel* the winters are ſo ſevere as to kill all the roſemary left abroad, yet lucerne ſurvives them there. This proves it more hardy than roſemary, which is planted for hedges in *England*; and here is ſcarce twice in an age a froſt that will kill it. I have known one ſingle lucerne-plant, in a poor arable field, that has ſtood the teſt of twenty-two winters, beſides the feeding of ſheep at all ſeaſons, and yet remains as ſtrong as ever. What quantity of hay this plant yearly produces cannot be known, becauſe, at thoſe times that cattle are kept from it, the hares conſtantly crop it, being ſweeter than any other graſs [a]."

But Mr. *Millar* gives us a ſtronger proof of its hardy nature. "That the cold, ſays he, will not injure this plant [at a certain age] I am fully ſatisfied: For, in a very cold winter, 1728-9, I had ſome roots of this plant, which were dug up in *October*, and laid upon the ground, in the open air, till the beginning of *March*, when I planted them again, and they ſhot out very vigorouſly ſoon after; nay, even while they lay on the ground, they ſtruck out fibres from the under ſide of the roots, and had begun to ſhoot green from the crown of their roots [b]."

SECT.

[a] *Horſe-hoeing Huſbandry*, 8vo, p. 201.
[b] *Dictionary*, Article *Medica*.

This ingenious author appears to be almoſt as well ſkilled in agriculture as in gardening: Witneſs what he ſays concerning

SECT. XXII.

Of the various Accidents and Injuries to which Lucerne is liable.

HE that cultivates lucerne, or indeed any thing that is curious and valuable in husbandry, has many difficulties to labour againſt, and many enemies to contend with. For, according to the beſt obſervations hitherto made, few things hurt lucerne more than wild, coarſe graſſes, weeds of all ſorts, cold, marſhy grounds, wet clays, and ſtagnating waters; for, though water affords one part of neceſſary nutrition to plants, yet water, without a certain degree of warmth, is rather hurtful than advantageous [d]. There is alſo another danger: For, as this vegetable is uſually tranſplanted in *Auguſt*, there may be weeping ſprings in the field, which are not diſcoverable at that ſeaſon. An accident of ſuch ſort ſurprized a gentleman the firſt winter after tranſplanting, yet he preſerved his lucerne (and has done ſo for three ſucceſſive years) by ſprinkling

ing the neglect of cultivating graſſes in general, and the common erroneous practice of ſowing graſs-ſeeds with corn, *&c.* He has alſo thrown out ſeveral valuable hints concerning the miſtakes and prejudices of farmers.

[d] Wherever the *mnyum*-moſs grows, the *red-rot*, and the *marſh-pennywort*, not to mention many other hurtful herbs that may be ſpecified on a more proper occaſion, there the water is *uncommonly cold, and perhaps of a poiſonous or mineral tinge.*

The teſt or criterion *here* recommended is the ſhorteſt, cheapeſt, and moſt eaſily attainable of any thing I have laid down in theſe Eſſays, and has only been omitted by huſbandry-writers, becauſe men ſcorn to contemplate what is near them and under their eyes, in order to ſpeculate upon that which is far diſtant and above them.

Grazing all low lands, where ſuch plants grow as above deſcribed (except perhaps in the height of ſummer) will occaſion the death of many ſheep, and cauſe ſome diſorders in larger cattle.

ſprinkling the wet patches with frequent dreſſings of freſh ſoot, or new chimney-aſhes, in *November* and the end of *February*.

It muſt be obſerved likewiſe, that this plant never flouriſhes near foul weedy hedges, or under the drip and ſhade of trees, or cloſe to garden-walls.

Inſects alſo hurt it frequently, but not ſo much in *England*, as in warmer countries.

(1.) It hath not yet been fully diſcovered by us (though ſomething of the kind happened in the ſpring of the year 1762 [m]) that turnip-flies mangle and deſtroy young lucerne-leaves; but, if they ſhould attack the nurſery (as I have reaſon to think they will at ſome particular junctures) or fall upon the young ſhoots in the plantation, you muſt apply to the gardening-pot, and ſprinkle the plants copiouſly with an infuſion of ſoot in water, made very bitter. This, in the preſent caſe, is both a medicine and a manure.

Virgil and *Columella* were both of them fully convinced, that certain ſteepings for ſeeds, and infuſions for watering young plants, and guarding them from inſects, were not only eaſily procured, but had often been applied with good ſucceſs. The recipe's mentioned by the former of theſe poets (I ſay poets, for the paſſage I ſhall tranſcribe from the latter, is taken from his *poem on Gardening*) are too well known to be inſerted at length, *Et nitro prius*, &c.[n] but the advice of *Columella* is as follows:

[m] We never knew theſe inſects pernicious to young lucerne, till the time above ſpecified, there being a drowth and harſh northern and eaſterly winds, more or leſs, from the beginning of *April* till the 6th of *May*; an unlucky ſetting-out to many people, who began their lucerne-nurſeries, for the firſt time, on the tranſplanting principle, and knew not how to prevent the evil, or leſſen it by having recourſe to ſoot-water, which, at one and the ſame time, is a corrective of the ſoil, an excellent manure, and the beſt remedy we know againſt the troubleſome attacks here ſpoken of.

[n] *Georg.* l. v. 194.

Sed ne dira novas ſegetes animalia lædant,
Profuit interdum medicantem ſemina pingui
Palladia (ſine fruge ſalis) conſpergere amurca,
Innatáve laris nigra ſatiare favilla.
Profuit & plantis latices infundere amaros
Marrubii, multoque ſedi contingere ſucco.
De HORT. CULT. v. 351, *&c.*

Leſt hurtful inſects ravage and deſpoil
The tender produce of th' expected crop,
Inſteep the *ſeedling-grains* with previous care
In rich *Palladian* lees, [o] (th' expence of ſalt
May frugally be ſpar'd) or ſow *them* mixt
With ſable ſoot and aſhes duſky-hued.
Kind preſents, which thy grateful *lares* give.
Nor is it labour thriftleſs to bedew
The embryon-plants, with ſtrong infuſion drawn
From ſedum,[p] or from hore-hound's bitter juice.[q]

There is an inſect in *France*, called, by the country people, *barbotte*, and deſcribed by *Des Serres*, as *une petite chenille noire*, [r] or a little black caterpillar, which, in time of drought, preys on the young ſhoots of this herbage, even one or two years after tranſplantation; cauſing the leaves to appear ſickly and diſcoloured. We never obſerved theſe miſchievous creatures in *England*; but, if they ſhould he diſcovered, it will be proper to cut the lucerne, though but ſix or eight inches high; and beſtow on the rows, in moiſt weather, or when large dews fall,

ſlight

[o] The lees of olives.

[p] The ſedum, here meant, is the *larger* ſedum. *Columella* mentions an infuſion of this plant in another part of his work, where he is ſpeaking of young turnips, and the turnip-fly.

[q] The hore-hound, here preſcribed, is the *black*. The *Italians* ſtill call it, from the *Latin*, *marrubium*, *marrobio*.

[r] See *Theatre d'Agricult.* fol. p. 273.

ſlight repeated ſprinklings of fine new ſoot; or, if you live near tobacconiſts, the duſt, at the bottom of their hogſheads, may not be amiſs; but this latter remedy is only mentioned upon the authority of others.

(2.) And here it may be juſt obſerved, in caſe you apprehend that a very common grub or maggot may deſtroy the young fibres of lucerne-roots (which with me is more than doubtful) or infeſt and injure a field of new-ſown wheat (a point ſtill more certain) it may not be amiſs to imitate the practice of farmers in *Perigord*, which is to put ſoon after ſowing in the four corners of the field (if the field be not large) an heap of dung amounting to a dung-cart load, or, in ſhort, ſuch a quantity as may preſerve the heat; and, if you open theſe heaps about *March*, you will find them full of inſects, which have many legs, and their head is armed with two ſhells, which, like a pair of ſciſſars, cut the roots and fibres of young corn for food.——Therefore in the month abovementioned, provided the headlands will give a little cart room to paſs, you may remove theſe heaps to ſome reſervoir of manure, as marle, virgin-earth, *&c. &c.* but not to the common farm-dunghil which is to be made uſe of in the ſame year. In ſhort, to no dunghil at all; for theſe inſects will not eaſily die, except the heat is quite evaporated.

The inhabitants of *Perigord* call this inſect *mulot*; in the *Patois* dialect, it is called *trauque-courge* i. e. *gourd-piercer*; our farmers (as I believe) give it the name of *grub-worm*, and aſſure me it becomes a chaffer in ſummer: For about *May* you may dig it up, with wings half formed.

Theſe inſects live two winters under ground, in the ſhape of the worm abovementioned; and deſtroy the roots of corn and fine graſſes. In the third year they undergo a metamorphoſis, and take the

form and name of *chaffers* about the months of *June* and *July*.

(3.) When you see a plant with yellow sickly leaves, without having received any external injury, you will generally find, upon examining the root carefully, a little lively carnation-coloured worm which causes this mischief: And here, again, foot-dressings are the best remedy (except the ground be of a burning nature.)

(4.) To this insect may be added another, called, by the *French* writers on husbandry, *puceron*, and, in *English*, *vine-fretter*, [d] which fattens also on the roots of wheat, and all garden-plants of the leguminous kind.

(5.) Whether moles eat the fibres of young lucerne-roots is more than I know, but certain it is, that they loosen the hold of the plants, and consequently do them great mischief, immediately after transplanting.

But there is a worse enemy to lucerne than all those that have been hitherto mentioned, and that is an owner who neglects cultivating the intervals, cleaning the rows, and manuring the plantation: For, in a word, except a person manages lucerne according to rules of art, he had better discontinue the project of raising it, and break up the ground once for all. *Martial*'s remedy may be applied here as a good one, though prescribed only to a poor unsuccessful poet:

———*Una litura potest.*

One perpendicular line, drawn thro' each page,
Will free thy work from faults and critic's rage.

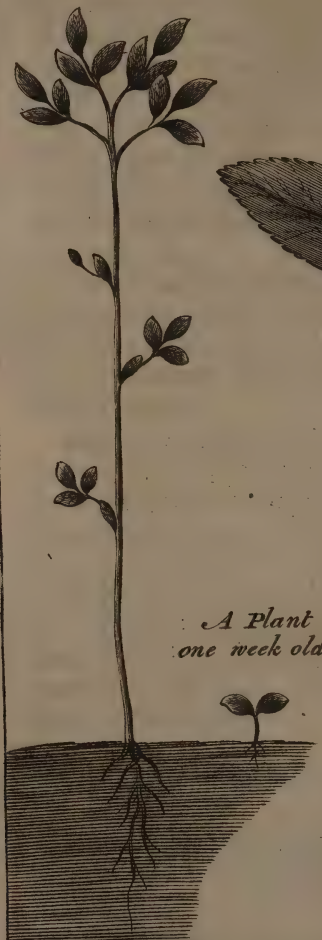
Or,

[d] *Columella* seems to have had some idea of a little mischievous insect of this kind, for, after having mentioned the depredations made by pismires, snails, and caterpillars, he adds,

Parvulus aut pulex irrepens dente lacessit.

A Plant of Lucerne in it's natural Size: five weeks old.

Lucerne Leaves in their natural Size.



The Flower in it's natural Size.

A Plant one week old

W. Hilbart ad vivam del. & sculp.

Or, to ſpeak more immediately to the purpoſe in the language of *Pliny* the elder on the ſame occaſion, *ſi evincerent herbæ, remedium unicum eſt aratio. —Sæpe vertendo, donec omnes aliæ radices intereant:* [c] *If weeds happen to overpower the crop, the only remedy is ploughing, till every noxious root is deſtroyed by diſturbing, turning, and pulverizing the earth.*

SECT. XXIII.

How to know young Lucerne in order to weed it.

IT being highly probable, from the larger part of the preceding ſection, that, as inſects may often attack lucerne in *England*, though not ſo frequently as in warmer countries, it behoves all people, concerned in nurſeries or plantations of it, to make themſelves well acquainted with the figure and ſhape of this vegetable, *when it firſt appears above ground,* [d] *or when it is about five weeks old:* But in ſpring and ſummer they muſt be particularly attentive, during dry harſh winds in the former ſeaſon, or when great heats and drought may moleſt us in the latter.

Thus, by diſtinguiſhing and knowing the plants, you may prevent, in a good degree, the depredations of the fly, which will diſcover the two ſeed-leaves, in all probability, ſooner than you; and, in the next ſtate of the plants, you will be able to weed them with ſafety, and may form a judgment likewiſe how far the nurſery is properly ſtocked;—whether, for example, you ought to let it ſtand (after waiting a fortnight to ſee the full event:) Or whether

[c] *Hiſt. Natural.*

[d] By the manner in which lucerne comes up, and makes its firſt appearance above ground after ſowing, I am inclined to think, that the ſeed ſplits itſelf into two lobes, that form a couple of ſeminal leaves; from the center of which a third leaf afterwards ſhoots forth.

you may not be obliged to new-dig the ground and ſow it afreſh: Though, as yet, we never had the ill fortune of being reduced to make this diſagreeable experiment.

As to lucerne in its infant-ſtate, no better direction can be given to know it, than by ſaying it comes up like clover: Nevertheleſs it varies a little, after it is a month old; and begins to put out three leaves; ſo that the maſter muſt be well acquainted with it under its firſt appearance, and the weeders under its ſecond.

SECT. XXIV.

Rules for ſaving and gathering Lucerne-ſeed.

I Will, in this ſection, diſengage the promiſe I have made to the reader of ſaying ſomething concerning the manner of ſetting lucerne apart for ſeed, together with the whole proceſs of ſaving the ſeed. The ſubſtance of the preſent article will be matter of curioſity at leaſt, and, perhaps, of ſome little utility. Nor would a treatiſe, on the culture of lucerne, be complete, without a chapter on this ſubject.

If the attempt of ſaving lucerne-ſeed in *England* ſhould appear to be worth carrying into execution, I flatter myſelf, that the obſervations here made, and the directions here laid down, will be conformable to the practice of the moſt ſkilful cultivators in foreign countries.

I have ſaved lucerne-ſeed with no great difficulty in *England*, but never could ſee a reaſon for preferring it to good lucerne-ſeed brought from the ſouth of *France*, *Italy*, *Switzerland*, and *Spain*. (1°.) The price of foreign ſeeds (at leaſt for twenty years) will be very little higher than our own.—(2°.) Such ſeeds will be better ripened; and (3°.) ſome advantages may reſult not only from change of ſeed, but be-

becauſe ſuch ſeed was raiſed at a conſiderable diſtance from us.

At the ſame time it is readily allowed by me, that we may ſave lucerne-ſeed almoſt as eaſily as the ſeeds of broad-clover, ſainfoin, trefoils, *&c.* but, to ſay the truth, I would ſooner receive all thoſe ſeeds from a warmer and drier country than ours.

Let me therefore continue to obſerve, as before, that if perſons are determined to ſave ſeed from *tranſplanted* lucerne (which will certainly yield the largeſt and ripeſt grain, each plant having enjoyed free air, room, ſunſhine, *&c.*) we then only grant this indulgence to them the year before the ground is to be broken up, and the crop diſcontinued.

I would give the ſame advice to thoſe who have raiſed lucerne by *drilling*. And, if either *one* or the *other* venture upon the undertaking, I would counſel both the tranſplanter and driller to manure the field *pro hac vice*, as ſhall be more expreſsly mentioned in another part of this ſection.

As for thoſe who are determined to ſow lucerne by *promiſcuous ſowing* in the manner of clover, they may, if they are ſo inclined, ſet aſide a crop for ſeed, whenever they pleaſe: For *ſuch* lucerne will be ſhort-lived from the very circumſtances of its culture; and any project may be ventured upon it, without running the riſque of loſing much; ſince, if *tranſplanted* and *drilled* lucernes (which grow wide plant from plant) can hardly ſupport the impoveriſhment of ſtanding for ſeed, without ſome extraordinary aſſiſtances; what can be expected from a *crop promiſcuouſly ſown*, which crop, if the ſeeds ſown take full effect (a piece of good fortune I never ſaw in *England*) or if half of them take effect, may contain, inſtead of *thirteen thouſand* plants, perhaps *five hundred thouſand?*—But then, generally ſpeaking, the plants will be diſcoloured, ſmall, weak, and ſickly; overpowered by weeds, and even moleſted

leſted by one another. So that, when they have not a quarter part nouriſhment enough, and yet want more than that quarter part (as they naturally will do, in order to perfect their ſeeds) they of courſe muſt periſh by downright famine. At leaſt, ſuch is uſually the caſe in our climate.

In the other two inſtances, if any gentleman has a mind to ſave the ſeeds of *tranſplanted* or *drilled* lucerne, either for uſe, or by way of curioſity, it is probable that the following inſtructions may not be unacceptable to him.

Whenever he purpoſes to ſet apart a crop for ſeed, he muſt cut the two firſt annual growths, when the plants are not arrived to ſuch an height as he ought, in general, to wait for, and before the flowers make their appearance, that the plants may acquire more ſtrength to ripen their ſeeds at the next cutting.

Whoever attempts to ſave lucerne-ſeed muſt lay his account in loſing one cutting at leaſt, if not two cuttings, *that* year; and, in the year *following*, he will find (without my telling him ſo) that his plantation will decline a little in health and ſtrength. In a word, he muſt, by the help of ſome comfortable manures in the ſucceeding autumn and winter, endeavour to makes amends for the impoveriſhment occaſioned by ſuch an effort. Such manures, whatever they are, muſt be oppoſite to the predominant ill temper of his ſoil.

When he propoſes to gather the ſeeds, the tops of the ſeeding ſtalks muſt be cut off with large horſe-ſciſſars, or a ſmall ſickle made on purpoſe; and the time muſt be juſt after ſun-riſing; ſince, otherwiſe, the huſks or pods will burſt and brit during the heat of the day.

The pods, that cut, muſt be dried in the ſun on a winnowing ſheet, and thraſhed out with a ſhort ſtick, in ſuch a manner as clover-ſeeds are thraſhed. The ſeeds muſt be paſſed through a very fine ſieve; for

for they are ſmall, conſidering the ſize of the plant that bears them. It will alſo be difficult to find them all, for they are extremely ſlippery.

As to the quantity of ſeed, *Agoſtino Gallo* tells us, that one hundred pounds is the common produce of an acre in *Italy*, that has been ſown promiſcuouſly like clover or trefoil.[c] I ſhould think a crop from drilled lucerne might anſwer better: And a crop from tranſplanted lucerne might exceed both. For, when the roots have ſpace ſufficient, they will procure more nutriment: Nor will they (if common care is taken) be defrauded ſo much by incroaching weeds as crops are that have been ſown by random ſowing. On the other hand, tranſplanted crops, particularly, will enjoy a freer air and more ſunſhine: Conſequently the ſeeds will be better ripened; they will alſo be larger, healthier, and more apt to vegetate when ſown.—Another great advantage is, that, as every plant upon this principle has, as it were, impartial juſtice done it, the ſeeds will be all ripe, *much nearer to the ſame time*; whereas there may be a month odds or more between plant and plant, among *thoſe* that have been ſown according to the *random broad-caſt* way; and, though the owner may have full choice to mow this crop, whenever he pleaſes, yet one half of the field will never be ripe at one time. Experience juſtifies this remark in regard to *England* particularly.

Having cut off the ſummits of the ſeed-branches, as above directed, care muſt be taken the next day to cut the remainder of the ſtalks, as near the ground as at other times of cutting; that is, within three or four inches of the crown of the root, otherwiſe the new ſhoots will not ſprout and flouriſh. This crop will be hay half-made at the time of cutting, and the reſt of the drying part, being finiſhed, may be given to cart-horſes, hungry yearlings, colts,

[c] *Giornata ſeconda dell' herba* MEDICA.

colts, and ſwine, which will reliſh ſuch plain hearty diet very well, and that for a reaſon aſſigned, which is almoſt peculiar to lucerne-hay.[d]

But obſerve here, that as the ſtalks, by ſtanding ſo long and ripening their ſeeds, will grow hard; of courſe, the ſickle, made uſe of to cut them, muſt be very ſharp, ſince the perſon employed in this work will be apt to pull upwards with one hand a little, whilſt he is cutting with the other, and may thereby looſen and incommode the roots. In this caſe, I would adviſe rather, that a pair of large, ſharp, gardening ſheers ſhould be made uſe of.

As to the crop of hay abovementioned, I think I have done ſufficient juſtice to it, in allowing that it will afford hearty food for coarſe, hungry cattle. However, an author, much eſteemed by me, ſeems to have gone farther than my experience will permit me to confirm: For, after allowing that ſuch a crop (including the tops of the ſeedling-branches after thraſhing) would give the owner two waggon-loads of hay upon an acre [e] (in which point we agree) he adds, that this dried herbage will not be inferior to the generality of hay, procured from common meadow and upland graſſes. The truth, perhaps, lies between us; I may have depreciated the crop a little, and he ſeems to have overrated it.

[d] See SECT. XVII, p. 73.

[e] By waggon loads, the author means the *Italian carro a quattro ruote*; which carries about 1400 lb. weight of hay. *Vinti Giornate* di Gallo, p. 36.

SECT.

SECT. XXV.

What ſort of Lucerne is beſt for Huſbandry-uſes.

AN enumeration of the ſeveral *varieties* of lucerne might have the appearance of changing the practical cultivator into a contemplative botaniſt. It may ſuffice therefore to ſay, that the ſeed of the upright ſort, which bears violet-coloured and purple flowers, is thought to produce plants, of the largeſt ſize. The blue-flowered lucerne is alſo valuable; and, in *Switzerland*, is to be found a large ſpecies of this plant, which bears yellow flowers.

In *Dalmatia*, a fine variegated ſort grows wild—Nor might it be amiſs, if curious cultivators were to procure ſeeds of the original *medica* from *Media*. If I miſtake not, *Tournefort* found one or two fine ſorts there.

The flowers of lucerne are leguminous, [b] or, as the learned call them, *papilionaceous*. From their impalement ariſes a piſtil, which afterwards becomes a wreathed *ſiliqua*, or pod, ſomewhat reſembling a ram's horn, in which are lodged ſeeds ſhaped like a kidney. The green plant has the taſte of naſturtian-leaves.

As the culture of lucerne and ſainfoin, according to the principles laid down in this Eſſay, is executed without much difficulty, it may tempt men, by imperceptible degrees, to apply their minds to the culture of corn, conformably to the practice of *new husbandry*. But this may be found a more complex, as well as a more difficult undertaking, as will appear from what will follow in the laſt paragraph of the laſt ſection.——

Again,

[b] Moſt plants and ſhrubs, that bear leguminous flowers, afford delicious food to cattle.

Again, when graſs-lands are only wanted to bring about a quick return of arable crops, then clover and trefoils are the propereſt vegetables that can be cultivated in ſuch caſes; for lucerne and ſainfoin come not to their full perfection till the *third* year.——

As this ſection is extremely ſhort, I will take the opportunity of employing one minute's reviſion upon what I have ſaid from *Agoſtino Gallo*, in my XVIth article, concerning ſowing lucerne-ſeeds with thoſe of panic-graſs. For, tho' firſt thoughts are generally the moſt fortunate in poetry, yet ſecond thoughts are the ſafeſt in proſe. Therefore being naturally fearful of miſleading my readers, or depending over-much on the authority of others, I will reconſider the point in a few words, and then leave the cultivators of lucerne to think and act for themſelves.

Upon reviewing the original, it appears to me, that the *Italian* author ſpeaks from his *own* experience: And for that reaſon (as well as from concurring probability) I believe the fact; and ſo much the rather, as he was a perſon of credit and genteel condition.

At the time when *Gallo* wrote, there was no better way of raiſing lucerne (as drilling or tranſplanting it were then things unheard of) than by mixing a good-quantity of panic-graſs ſeeds[s] with 20lb. of lucerne-ſeeds for every acre. For the panic-graſs (ſays he) having overpowered the weeds, will periſh the ſecond year, and leave the lucerne-roots in full poſſeſſion of the ground. *But my ſecret fear is, that panic graſs will exhauſt the ſoil*; nevertheleſs, as its ſtands but one year, a good previous manuring may obviate this apprehenſion. Be that as it will, I think

[s] Our farmers (if I miſtake not) call the panic graſs *cow-quake*.

I think it honeſt to put the cultivator upon his guard.

Nor can we (as I ſuſpect) either in *this* point, any more than in what has been obſerved concerning harrowing lucerne, draw ſafe and certain concluſions from ſucceſs in *Italian* huſbandry to ſucceſs in *Engliſh*. A ſoil phlegmatic like ours, liable to perpetual rains, and unenlivened with the ſame degree of ſolar heat, gives nouriſhment to an hundred obſtinate perennial weeds, whoſe proper ſupport is derived from a cold, ſickly moiſture which the *Italian* climate is not acquainted with.

Once, in order to copy *Gallo* to a certain degree, I ventured to ſow hop-trefoil with lucerne, inſtead of panic-graſs: (Hop-trefoil being confeſſedly an *annual* plant, and a weak exhauſter of the ground, or rather the contrary;) but the ſucceſs of this attempt, after ſeveral repetitions, was not ſuch as allows me to recommend the practice of it. I had a beautiful crop the firſt year; but in the ſecond, as *Pliny* foretels, *deſcivit in pratum*; and (what is ſtill worſe) that meadow contained little more than weeds.

So eaſily is lucerne over-run and devoured by theſe hungry ſavages, except the huſbandman ſupports its well-being and proſperity by virtue of a firm and faithful alliance.

Yet ſtill the *Italian* practice ought to be tried, as the loſs, reſulting from ſuch an experiment, is hardly worth mentioning.

SECT.

SECT. XXVI.

Some Objections anſwered, with Relation to the preſent Diſcovery of cultivating Lucerne by Tranſplantation.

IT is natural to expect, that many objections will be made to this *new practice of tranſplanting lucerne*. Some will ſay, that amputating a tap-root is counterworking the original intention of nature. But then it muſt be anſwered, that the Supreme Being has left many things to the perſonal induſtry and diſcoveries of man.—Others will remark, that the culture of lucerne has been diligently ſtudied, at leaſt, at intervals, from the times of *Virgil* and *Columella* to the preſent moment. How came a perſon then to diſcover this mighty ΕΥΡΗΚΑ in a corner between *France* and *Switzerland?*——To which we can only reply, that, in like manner, the mines in *Miſnia* and *Bohemia* were firſt diſcovered, by ſome poor *Corniſh* men who fled from *England* about the 15th century.

Thus the ſembrador (a ſort of plough, with an hopper annexed to it, contrived to ſet corn at equal diſtances) was firſt invented by an *Auſtrian* engineer, whom the emperor of *Germany* ſent afterwards to *Madrid*, that he might inſtruct the *Spaniards* in the manner of making and uſing it. [a] Thus the uſes of the magnet were found out, the art of printing, the medicinal application of plants from the wild *Indians*, and many other valuable diſcoveries: For, ſometimes, *the humbler things of this world are appointed by God to ſurpaſs and confound the ſtronger!*

From my own private opinion, I think I could almoſt venture to aſſert, that M. *de Chateauvieux* rea-

[a] *Willoughby*'s Travels into *Spain*, 1663, p. 426.

reaſons modeſtly concerning himſelf upon this occaſion, and perhaps ſays,

Primum ego me illorum, dederim quibus eſſe colonos,
Excerpam numero. [d]

A third ſet of men will object, that the trouble and tediouſneſs of raiſing and cultivating lucerne, in the preſent manner, are over-great, and too much clogged with minute cares and attentions. But *induſtry*, [e] in huſbandry, being the *condition* decreed by the Supreme Being, in conſequence of the fall of man, we ſhall not preſume to expoſtulate with our great and good Creator upon that ſubject, who has threatened to puniſh a ſtate or kingdom where the inhabitants are negligent even in husbandry: *With arrows and with bows ſhall men come thither, becauſe all the land ſhall become briars and thorns; but, upon the hills that are digged with a mattock, they ſhall not come thither:—But it ſhall be for the ſending forth of oxen, and for the treading of leſſer cattle.* [f]

Nor need we expatiate more under this article; for time and habitude, by gentle degrees, will cure all the aſtoniſhment of novelty. *Lucretius*, according to his accuſtomed manner, has touched beautifully upon this idea: For men ſeem to ſtand amazed, at firſt, upon any new diſcovery; but, after a few years have elapſed, they then conſider *it* as coeval with the world, and no ſubject for wonder at all:

Sed neque tam facilis res ulla eſt, quin ea primum
Difficilis magis ad credendum conſtet: Itemque
Nil

[d] *Horat. Epiſt.* Lib. i. Ep. 14.

[e] Lord *Bacon* enforces induſtry from a very natural inducement, "Quod opera & virtute noſtra partum eſt, majus bonum: Quod ab alieno beneficio vel ab indulgentia fortunæ delatum eſt, minus bonum."

Colours of Good and Evil, vol. III. p. 391.

[f] *Iſaiah* vii. 24, 25.

Nil adeo magnum nec tam mirabile quicquam
Principio, quod non minuant mirarier omneis
Paulatim, ut cœli clarum, purumque colorem.[d]

Nothing is found ſo eaſy, but appears
Full difficult at firſt to be believ'd:
Nothing ſo great or wonderful, but men
Forget and overlook by ſlow degrees:
Witneſs the clear, tranſlucent light of heav'n!

SECT. XXVII.

An Inquiry into the Reaſons of the Prejudices which Farmers and Labourers entertain, in Oppoſition to the NEW HUSBANDRY.

THE objection, that lucerne by growing ſo faſt is a great impoveriſher of land, has been already obviated in the VIIIth Section; and, in a word, though horſe-hoeing, hand-hoeing, digging between the rows, and frequent ſlight manurings, may appear to be troubleſome, and really are ſo, yet the expences and labour are ſoon repaid; and, indeed, Providence ſeems to have left no other expedient than human induſtry, if we deſire to keep any one crop in long continuance: Taking care, at the ſame time, to call in the aſſiſtance of ſlight and frequent ploughings, *&c.* For, by conſtantly dividing and looſening the ſoil, we bring a ſtiff ſtrong land, by degrees, to an eaſy prolific ſtate; which *Virgil* has expreſſed in one hemiſtyc that contains more good ſenſe and true knowledge of agriculture, than is to be found in a modern volume. Induſtry, ſays he, converts a ſtubborn, ſtiff, tenacious ſoil into the PUTRE *ſolum*:

——Nam-

[d] Lib. ii. v. 1025.

——Namque hoc IMITAMUR ARANDO.
GEORG. II. v. 204.

Where the ſtrength and beauty of the thought are ſo very plain and forcible, that *Dryden* ſeems to be animated with them, and has ſurpaſſed not only himſelf, but even equalled the original, if we except the brevity and ſententiouſneſs of *Virgil*:

For ploughing is an imitative toil,
Reſembling nature in an eaſy ſoil.

Nothing can exceed the brevity and force of this paſſage, except it be a ſimilar paſſage in one of the prophets: BREAK UP *the* FALLOW GROUNDS *of your* HEARTS.[c]

The remainder of this ſection ſhall be ſet apart for examining into the cauſes and reaſons of *an uncommon difficulty* which moſt gentlemen are obliged to ſtruggle with, when they firſt undertake to make a *nurſery* for lucerne, and then *tranſplant* it.

I have attempted, various times (and that unſucceſsfully for many years) to comprehend, if it were poſſible, why bailiffs, farmers, and day-labourers, ſhould entertain ſuch an incurable averſion to the *new huſbandry?*—That there is labour employed in it muſt be allowed: But it is ſlight labour, and well paid for.—[Therefore *that* ſeems not to be the true reaſon.]——Let us proceed one ſtep farther, and ſuppoſe theſe men to be prejudiced againſt the undertaking, or doubtful concerning its ſucceſs? Yet ſtill they run no hazard in making the experiment, and incur no blame in caſe of a miſcarriage; being ſure of their gratification, when the work is done. So that, though both theſe reaſons may conclude in part, yet ſtill they are not the true ſpecific

[c] *Jer.* iv. 3. See alſo *Hoſea* x. 12.

reaſon.—The like may be ſaid of theſe mens averſion to novelty, and their tenaciouſneſs of antient habitudes; yet even this diſinclination may be overcome by the counterbalance and acquiſition of gain. Manufactures, artizans, peruke-makers, taylors, *&c.* (who ſeem, in other reſpects, to be wiſer than the countryman) ſoon familiariſe themſelves to what is *new* in their buſineſs, and like it, Why? Becauſe they get by the inconſtancy of mankind, and the change of faſhions. So that this objection is only a partial one. And, in proof that the trade's-people are in their way more docile and more vigilant than the husbandman, let it be remembered, that the invention of dying the *Saxon* green was brought to *London* in the year 1748, and all *Great-Britain* and *Ireland* knew how to imitate it before the year 1754, though the ſecret was preſerved from taking air by many precautions. But the generality of husbandmen paſs away life without making any reflections upon agriculture, and grow old, long before they have taken leave of their infancy.

In order to inform myſelf better, on the ſubject before us, I inquired of country-people, even parties concerned, what might be the true reaſons, and deſired them to be explicit? But they gave no diſtinct anſwer; which, at length, led me to ſuſpect, that a ſort of natural good manners, and fear of giving offence, compelled them to be ſilent. The *main* reaſon, therefore, ſeems to be (and eſpecially if we conſider how bounded the capacities of theſe men are, and how clogged with prejudices) that every ſuch ſort of employment appears to them *as merely trifling*, or, at moſt, a labour of ſupererogation. This being premiſed, it is then certain, that all men, wiſe or unwiſe, *under this perſuaſion* (be they right in their notions, or miſtaken) will be tired of going through any work that carries *ſuch* an aſpect with it, even though it be profitable. In proof of this, take

take a labouring-man, from cleaving wood, and order him to gather up, one by one, a pint of pins, ſcattered on the floor of a room, at the ſame wages he was to have received for performing harder work. —In ſuch a caſe, what will be the conſequence? He will feel diſſatisfaction and diſguſt againſt his new employment in half an hour. Or ſuppoſe a gentleman was to bid a country day-ſervant to leave off breaſt-ploughing a field (than which there is ſcarce any huſbandry-work more laborious) and then order him to take a light hoe in his hands, and work upon a thin ſurface of water, than which nothing can be cut or divided more eaſily; merely for his (the gentleman's) pleaſure, or for ſome reaſon which he keeps a ſecret: The maſter, upon this, meets with compliance; but the edge and appetite for work go off immediately in the honeſt peaſant thus employed: For he fancies himſelf, as *Shakeſpear* expreſſes it, to be the *image of labour in vain*. His hands move liſtleſsly and unwillingly: He grudges even every inſubſtantial ſtroke he gives, and heartily wiſhes for the approach of night.—— Thus appear all the operations in the new huſbandry to bailiffs, farmers, and labourers, though the caſe be widely different; but, not being able to comprehend how their labours can tend to any uſe, they are as much chagrined, as if employed in gathering up pins, or hoeing water: But, when they once ſee the good effects of their labours, they, at length, grow perfectly reconciled to what they deſpiſed, hated, and even laboured, by their unfaithfulneſs, to render uſeleſs and ineffectual. There were the ſelf-ſame objections made at firſt to the culture of vineyards, hop-gardens, and ſaffron-plantations: As alſo to the raiſing of woad, madder, liquorice, maize, tobacco, field-turnips, and twenty other ſorts of vegetables, which are now managed by country-people, with as much good-will, as if they were com-

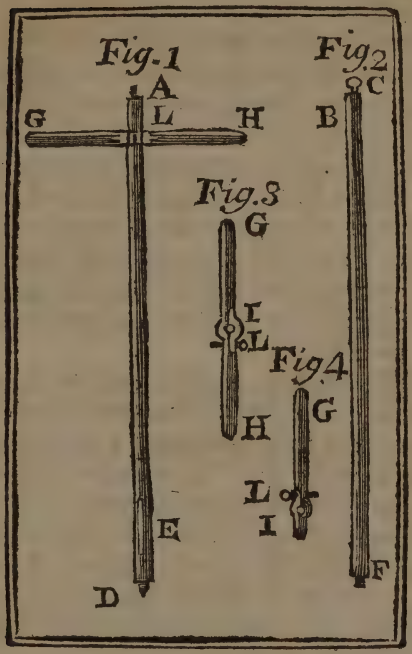
mon crops of wheat or barley. All which confirms the neceſſity of what has been before advanced, namely, that no gentleman muſt leave the culture of lucerne to ſervants in the firſt beginnings of the experiment.

SECT. XXVIII.

Of drilling Lucerne, and the Uſe of the jointed Screw-borer.

THOSE who drill lucerne, with an intention it ſhould continue in the ſame place where it is drilled, muſt take great care to inſtruct themſelves, before-hand, of the depth of good ſoil in the field they ſet apart for this purpoſe: For the tap-roots, in their natural ſtate (or, in other words, without being clipped) will penetrate downwards ten, or more feet, by the time the plants are three or four years old. Previouſly, therefore, to any preparation of the ground, call in the aſſiſtance of a very uſeful inſtrument in huſbandry, named the *borer*, of which, perhaps, you cannot have a better model than the following draft.

The jointed SCREW-BORER.



This jointed ſcrew-borer may be multiplied to a length of a 100 feet, in order to ſearch for quarries, mines, *&c.* But ſuch deep reſearches have nothing to do with our preſent purpoſe. Nor is this inſtrument of much, though confeſſedly of ſome uſe, where the lucerne-roots are *amputated* and *tranſplanted*; ſince, in ſuch a caſe, we need only examine the nature of the ground to the depth of one yard. But where we *drill* lucerne, or ſow it *broad-caſt* faſhion, it will be neceſſary to form a judgment of the ſoil to a depth of twelve feet: (For ſo far downwards the roots will penetrate, if they meet with no obſtruc-

tion from rocks, &c. or inconvenience from weeping ſprings.) In this caſe, two joints of the borer will ſuffice.

The inſtrument, above repreſented, is compoſed of two iron-bars, marked Fig. 1. Fig. 2. each bar ſix feet in length, and one inch in thickneſs or diameter; the former ſcrewing into the latter.

The end A. Fig. 1. carries a ſcrew which enters into the ſocket B. Fig. 2. after you have unſcrewed the little button oppoſite to C, contrived partly to hinder earth and duſt from getting into the ſocket. Theſe ſcrews are an inch and half long, and eight lines thick; ſo that there remain two lines of thickneſs for the ſocket.

D. Fig. 1. is a ſharp point or noſe, ſomewhat *camuſed*, as the marquis *de Tourbilli* expreſſes himſelf (or, in other words, bluntiſh, and turning a little upwards) contrived in ſuch manner, for better forcing its way through the earth, rocks, &c. Its length is about three inches, and you may make it with three, or four ſides, as you judge to be moſt convenient. It is ſcrewed into the bar A. in the ſame manner, and with a ſcrew of the ſame ſize, as A. is ſcrewed into the bar B.

E. is an aperture or groove made on which ſide of the bar you pleaſe, ſix inches long, four lines broad, nine lines deep, and rounded at bottom, in order to bring up a part of the different *ſtratums* of matter, whilſt you are boring. And if in the preſent inſtance of cultivating tranſplanted lucerne you fear weeping ſprings (which are very detrimental to the growth of this plant) you may ſoon know where to find them, by putting a bit of ſponge into the groove.

The lowermoſt end of the bar F. Fig. 2. carries a ſcrew which enters into another ſocket, if you are deſirous to lengthen the inſtrument by adding a new

new joint, and ſo on, to a length of one hundred feet. But an examination of the ſoil, to a depth of twelve feet, is quite ſufficient for our preſent purpoſe.

To put this inſtrument properly to work, uſe muſt be made of an iron-handle, called, otherwiſe, in mechanics, a *double-branched lever*, which is marked G and H, and each branch is fifteen inches long. This handle, or lever, is faſtened by a claſp I, lined with ſteel, fixed at one end by a hinge, and at the other by the ſcrew L, by which means it may be placed at whatſoever height the labourers pleaſe. This ſcrew is faſtened, or unfaſtened, by an iron pin, ſix lines thick, and eight or nine inches long.

Fig. 3. is a plan of the ſame handle, or lever, ſeparated from the bar of iron, and marked by the ſame letters G, H, I, L.

Fig. 4. is a handle, or lever, reſembling that which has been deſcribed above, with this exception, that it has only one branch marked G. The letters I and L denote the ſame as in the foregoing. This laſt named handle, or lever, ſerves, at times, to ſuſpend or ſtop the *borer*, when we are bringing it up from a conſiderable depth: As alſo to ſcrew and unſcrew the ſeveral bars, or joints, as occaſion requires: And to put on, or take off, the point or noſe of ſteel at bottom.

But of this more needs not be ſpoken at preſent, as all borings, with reference to exploring the ground for raiſing lucerne, will go but a little way beneath the ſurface of the earth. Thoſe who ſearch for mines, quarries, *&c.* may find farther information in the marquis *de Tourbilli*'s *Memoire ſur le Defrickemens.*

In ground ſet apart for receiving *tranſplanted* lucerne, it is hardly requiſite to have recourſe to the borer at all; and in land where we raiſe it, either

by drilling, or in the manner clover is ſown, we need only uſe two joints of the borer: And two men, generally ſpeaking, (if the ground be tolerably well conditioned) may bore to a depth of twelve feet in a quarter of an hour: And, of courſe, in one day, make a ſufficient number of eſſays for one acre of ground, one trial being enough for every ten perches ſquare.

The difficulty of finding a good ſoil, to a depth of eight, ten, or twelve feet, ſeems to me to have been one of the reaſons which induced M. *de Chateauvieux* to amputate the extremity of the tap-root: Other reaſons have been formerly aſſigned by me.

SECT. XXIX.

How to manage large Plantations of Lucerne in the cheapeſt, ſafeſt, and moſt œconomical Manner.

AS I would willingly make this Eſſay as inſtructive as lies in my power, and at the ſame time ſave induſtrious cultivators the trouble of collecting and combining directions from various diſperſed paſſages, it may not be amiſs to beſtow one ſection more, by way of anſwering a couple of queſtions which have been often propoſed to me in letters.

The firſt queſtion is, How and in what manner (by way of reſult from the conſiderable number of experiments made by me) I would adviſe any gentleman to prepare three or four acres of land for receiving lucerne? This being an undertaking of ſome moment, or, as the *French* call it, *une grande exploitation.*

The ſecond queſtion is, How to perform this work in the ſhorteſt, ſafeſt, and moſt œconomical manner?—Concerning both which points my ideas are as follow: This only premiſed, that I am here endeavouring to make the expence of the undertaking

taking as cheap as poſſible; otherwiſe, where people pay no regard to a few incidental charges, I would recommend Mr. *Boyle*'s method of preparing a field for receiving tranſplanted lucerne, concerning which more has been ſpoken at large in the 82d page of this Eſſay.

In the preſent caſe it may ſuffice to ſay, that ſuppoſing the nurſery to be properly prepared, and the ſeeds ſown in the firſt week of *April*, before the ſeaſon for tranſplanting, according to directions already given.—I would recommend a field in good tilth, after barley-harveſt, and before oats have been ſown in it. This field ſhould be thoroughly ploughed and harrowed twice; which we will ſuppoſe to be, for example, in the autumn of the preſent year, 1764. After each plowing and harrowing there ſhould be a very diligent burn-beating, according to rules laid down, SECT. III.—But, if the ſeaſon ſhould prove too wet at the time of a ſecond burn-beating, we muſt make a virtue of neceſſity, and the weeds and trumpery muſt be raked together and carried off.

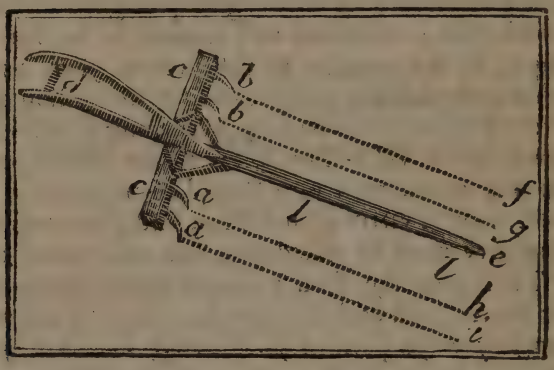
Then give the field a trench-fallow-ploughing for winter, and early in *March*, 1765, (if the weather any-ways permits.) Having manured your ground, as the relative nature of the ſoil requires, and ploughed and harrowed it again to an exquiſite fineneſs, drill in a crop of field-peaſe, making uſe of M. *Vanduffel*'s [o] *drill-rake*, as early in the ſpring as is conſiſtent with prudence and ſafety; for this crop muſt be ripe, and removed, by the laſt day of *July*.——Much depends upon this point of foreſight; however the peaſe, by ſtanding thinner than in hand-ſown, promiſcuous crops, being at the ſame time banked and hoed with greater eaſe, and enjoying more room, free air, and ſunſhine,—will in all probability gain an advance of ten days at leaſt in their ripening. This will be a great point ſecured. For it is in huſbandry, as in war: There are

[o] M. *Vanduffel* is a treaſurer of *France* at *Bayonne*.

are critical moments, which never preſent themſelves a ſecond time in the ſame campaign.

I will now ſpeak of the manner of letting this pea-crop into the ground, and of M. *Vanduffel*'s drill-rake. This inſtrument has been often made uſe of by myſelf and friends, with good ſucceſs, much expedition, and little trouble. But we muſt obſerve, that it is chiefly calculated for light grounds in ſmall incloſures, not exceeding four or five acres.

The DRILL-RAKE.



This inſtrument is a ſort of ſtrong plough-rake, with four large teeth at a. a. and b. b. gently curved, as repreſented in the print. The diſtance from a. to a. and b. to b. is nine inches.

The ſpace, or interval, between the two inner teeth, a. and b. is three feet ſix inches [b], which is

[b] Something more ſpace is allowed in the intervals of a pea-crop than in a lucerne plantation, becauſe the *cultivator*, or *hoe-plough*, never enters the lucerne-field, till after the herbage of the plants is cut: Whereas the pea-branches ſpread much, and the roots are ſhallow and tender, quite different from lucerne-roots. It is therefore my opinion that field-peaſe, thus managed, can admit but one horſe hoeing; and the intervals may be made ſtill wider, if people pleaſe.

is ſufficient room for the cultivator or hoe-plough to move in, if conducted with care, before the peaſe have branched much. To the piece of timber, at the head of the rake, denoted by the letters, c. c. are fixed the handle, d. and the beam, e. to which the horſe is faſtened.

It is pretty certain, that, when this inſtrument is drawn over a piece of land made thoroughly fine, and the man, who holds it, bears upon the handles more or leſs, according to his diſcretion, four channels or little furrows will be formed at the letters, f. g. h. i. which will be found to be diſtant nine inches from furrow i. to furrow h. and as much from g. to f. the interval marked e, being three feet and an half from h. to g. and, that theſe diſtances may be preſerved with greater truth, it has been found neceſſary that the two teeth, a. a. ſhould return (when the ploughman comes back, after having ploughed one turn or *bout*, as they call it) in two of the channels formed before, marked b. b. : So that, though he cuts four drills at the firſt bout, yet, in effect, he only forms two drills each turn, becauſe there are always two drills to be paſſed over twice or re-ploughed, being, in truth, not much more than guides, or marks of direction. Yet even this ſmall work of ſupererogation repays itſelf, becauſe it makes the drills more open, diſtinct, and clean.

If the firſt four channels, formed at one motion by this inſtrument, are ſtraight and true, all the lines in the field will partake of the ſame regularity. It has therefore been my cuſtom to lay out this firſt trace of the drill-rake myſelf by exact meaſurement, fixing into the ground, at every diſtance of ten feet, little ſlit ſticks labelled with paper; and, that being finiſhed, leave the reſt to the ploughman.

When the ground-plot of an acre is thus formed into drills (which work I have ſeen completed in four

four hours with one ploughman, horſe, and boy to lead the horſe) you then ſend two or three women and children into the field, who *ſprain*[r] the peaſe into the channels.——Uſe no harrow, which will draw the ſeeds out of the lines; but cover them with the flat part of the head of an hand-rake, and preſs them down gently.

This practice was well known to the *Grecian* huſbandmen; for *Leontius* greatly prefers the covering of ſeeds by hand to common harrowings even by oxen, which trample the ground leſs than horſes[s].

I will now only obſerve of this drill-rake, that, different from the hoe-ploughs of *Du Hamel*, *De Chateauvieux*, and *De la Levrie*, its great excellence conſiſts in its ſimplicity: For, after the meaſurement of the parts is once laid down, the meaneſt carpenter and ſmith in *England* can make it, or repair it; and, if the firſt four lines formed by it are true, the reſt of the lines or rows muſt be geometrically exact: Which is an elegance none can feel, but ſuch as take delight in correct huſbandry.

But return to our lucerne-plantation.

This pea-crop being hacked, and moved from the field by the fourth or fifth of *Auguſt*, call in all the aſſiſtance you have of huſbandry-ſtrength, or can procure; and plough and harrow the field, and burn the pea-roots, weeds, *&c.* as often as you have time before the twentieth of *Auguſt*; and then (your nurſery being ſuppoſed to be in perfect readineſs) tranſplant

[r] To *ſprain* ſeeds is to throw them with a ſingle motion of the hand at a certain diſtance one from another.

[s] Τὸ σπαρέντα τὸ μὲν καλλιτον δὲ ἀνθρώπων ἐπισκάπτεθαι, ἵνα πάλα καλαχωσθῆ· εἰ δὲ μὴ, κἂν διὰ βοῶν σκαλλέσθω.

GEOPONIC. Lib. ii. c. 24.

This writer (*Leontius*) flouriſhed under the emperor *Juſtinian*. We have a couple of his epigrams extant in the fourth book of the *Greek Anthology*.

tranſplant your roots as before directed, and contrive to cloſe your work by the end of the month.

SECT. XXX.

Miſcellaneous Obſervations, and ſhort, uſeful Hints concerning Lucerne.

THIS ſection ſhall conſiſt of *miſcellaneous obſervations*, and *ſhort, uſeful hints*, which it was no-ways neceſſary to conſider more at large.

(1.) We know no better proof of the ſweetneſs of lucerne than that an horſe will never leave a ſprig in the rack or manger, or even on the ground. (2.) If you have free choice of ground in the field wherein you tranſplant lucerne, or, in other words, the power of placing your rows in what direction you pleaſe, then let the rows front the mid-day ſun [d]. (3.) No better place can be found than a hop-garden, if the owner thinks fit, or ſees reaſons for diſcontinuing it. (4.) No water muſt be allowed to lodge in the nurſery or plantation. (5.) Hares and rabbits muſt be chaced away, or in ſome other manner prevented; for, as the former range much at night, eſpecially in ſpring, they will change their old abodes, and lodge themſelves in the neighbourhood of a lucerne-field, where they commit great ravage, brouzing the young ſhoots of

[d] This rule, where there is the ſame free choice of moving which way you pleaſe, muſt not be extended to the lines or furrows of corn-lands, whoſe courſe or direction are, by no means, matter of ſuch indifference as to be left to chance, or the ploughman's fancy. The lines or furrows of corn, therefore, in caſe there be no impediment or obſtruction, ſhould always run from *north* to *ſouth*, and not from *eaſt* to *weſt*. The curious may ſee the reaſons aſſigned in the marquis *de Tourbilli*'s *Memoire ſur les Defrichemens*, pag. 888, 889: But I ſhall avoid inſerting theſe reaſons at preſent, and confine my remarks only to lucerne, or ſainfoin drilled, or tranſplanted in rows.

of the plants, as fast as they recover and sprout afresh, till they bring them at last into a downright atrophy. (6.) Geese and ducks must have no admittance into a lucerne-field. (7.) If you manure the land set apart to receive the transplanted roots, take care to spread this dressing two months before the roots are moved into it. (8.) Lastly, the culture of lucerne depends as much on industry as skill; for it was the custom of the *French* near two centuries ago, when they prepared a field for receiving the seeds, to give the ground sixteen months fallow with ploughings and harrowings; but hand-hoeing and horse-hoeing have made the management more easy, and less expensive at present: Yet still there remains some labour, some care, and some expence; for delays and negligence are avowed enemies to good husbandry:

——*Cereris contraria semper*
Sunt operi——[e].

SECT. XXXI.

Farther Remarks on the Necessity of using Manures.—Also on neat Husbandry and Industry.

WE cannot conclude this Essay without observing, that it hath been asserted by the enthusiastic admirers of drilling, transplanting in rows, and hoe-ploughings, both at home and abroad, that no manures are needful to support the credit of their system, even in the cultivation of lucerne and corn.[f] Indeed, we allow, that vegetables

[e] *Ovid. Metam.* Lib. V. v. 814.

[f] It is not in *Europe* as in *Louisiana* and *Chili*, and some of the warmest parts of *Canada*, where wheat has been sown successively on the same land for eighteen years without manuring.

I can only remember, that a crop of wheat in *England* has been raised for five successive years upon the same ground without

bles may be thus raiſed and continued many years, without the aſſiſtance of dreſſings; but this is weakening the ſoil, and defrauding the plants, merely through vanity and love of paradoxes. It may be more prudent therefore to recommend ſlight frequent refreſhments at certain convenient times and diſtances. For manures, let men diſpute, contend, and wrangle ever ſo long about laying them aſide, are, in many caſes, equally requiſite with tillage and weeding. The beſt ſoils expect ſome aſſiſtance, and the weaker ones demand a great deal.—So that upon the whole, an ingenious foreign author has reconciled theſe difficulties very well. "Abundance of manure, ſays he, ſupplies the want of good culture; and good culture, reciprocally, makes amends for deficiency of manure: But the ſureſt and moſt adviſable method is to make uſe of *both*." And, as to the utility of manures in particular, the two *Quintilii* have left us the following remark, which the reader is deſired to take in the words of *Cornaro*'s tranſlation: *Bonam terram ſtercus meliorem facit, vitioſam autem amplius juvabit. Bona igitur terra ſtercore multo non habet opus: media paulo ampliore; tenuis vero & imbecilla multo: Non acervatim autem, ſed denſius ſtercorandum eſt.*[f]

Laſtly,

out manuring: (And *that* according to the practice of the *old huſbandry*, which is more extraordinary:) But then it muſt be obſerved, that this land was uncommonly circumſtanced. It was a dry, ſound, healthy ſoil. It had lain in graſs for a century at leaſt; and once a year a great fair for cattle had been held upon it, which the owner of the ſoil thought fit to diſcontinue.

[f] *In Geopon.* Lib. ii. c. 19.

I am well informed, ſince M. *du Hamel* publiſhed his laſt work, in 1761, that M. *de Chateauvieux* found, by experience, that in ſpite of all aſſiſtances from ploughing, without uſing manures, he carried a viſionary idea of *Tull*'s too far. Of courſe, he returned to the old practice, combining one and the other, as before recommended; and, as his fields had been thoroughly pul-

Laſtly, there is a ſimplicity and variety in the neat field-husbandry, here recommended, that exceeds all the ſtudied elegance and regular accuracy even of parterres and gardens, which tire us ſoon, ——for they imply reſtraint.——They bound the eye, and ſeem to treſpaſs upon our liberty :——— Whereas the fields are the free range and dominions of nature.—The difference of culture proves the ſuperiority by the very crops that are obtained.—To raiſe a beautiful flower is a ſlight amuſement : To bring corn and graſſes to perfection are matters of attention and ſerious labour. The *firſt* may be called an avocation, but the *ſecond* is a buſineſs ; and for theſe reaſons the Supreme Being has made perpetual exerciſe and diligence in agriculture as neceſſary as our bread, and as intereſting as life itſelf. [e]

Of this truth the heathen writers, on huſbandry, had ſome, imperfect traditional notions ; they knew what difficulties were annexed to the culture of land, and beheld plainly all the happy effects of diligence and induſtry. " The earth, ſays *Columella*, is not effete or worn out ; but men are indolent." [f] " Allow her only a moderate repoſe once in three years (beſtowing, at the ſame time, a certain quantity of manure) and *ſhe* will reſume all the vigour and ſtrength of a conſtitution reſtored to youth." [g]

Heſiod,

pulverized and cleanſed from weeds, every ſpoonful of manure took effect, and the produce of corn was very ſurprizing.

We make this remark for the ſake of the new huſbandry in general, as alſo to ſet right a paſſage in M. *du Hamel*, which held true in the year 1754; his words are theſe : " Quoique M. *de Chateauvieux* n'ait pas fumé ſes terres depuis qu' il a adopté nôtre nouvelle culture, il a neanmoins été ſatisfait de ſes recoltes." Tom. IV. pref. p. x.

[e] *Spectacle de la Nature.* Tom. II. dial. 2.

[f] *De Re Ruſt.* Lib. ii. c. 1. p. 47.

[g] Sola terra nunquam iraſcitur homini.—Benigna, mitis, indulgens, uſûſque mortalium ſemper ancilla, quæ coacta generat, quæ ſponte fundit. Plinii *Hiſt. Nat.* Lib. ii. c. 63.

Heſiod, *Virgil*, and *Varro*, recommend induſtry, in huſbandry, with as much earneſtneſs as *Columella*: But, as we ſhall have ſome other occaſion of referring to them more than once, it may ſuffice to ſubjoin a ſhort extract from *Pliny* the elder:

"One *Creſimus* (ſays he) being made a freed-man, purchaſed a little farm, where, by dint of ſkill and and unwearied application, he raiſed ſuch ſurprizing crops, that the neighbouring huſbandmen all accuſed him of magic; alledging, in particular, that he enriched his own fields, and impoveriſhed theirs. A day of trial was appointed before the ædile of the diſtrict. *Creſimus*, after various allegations produced againſt him, found means to bring his ſpades, ſcythes, and reap-hooks into the court, where, upon examination, they appeared to be very bright and exceedingly clean. His ploughs and harrows were next exhibited; they were ponderous, ſtrong, and admirably made. His cattle then paſſed along the ſtreet in review; they were in full proof, large, and well fed. Behold, O *Romans*, cried he, theſe are my magical arts in agriculture, but ſome there are, which it is not in my power to produce; I cannot make you ſee the ſweat of my brows, when I toiled and laboured; nor have I kept a minute diary of my unwearied induſtry, and perpetual fatigue, late and early."

Upon this, every ſenſible by-ſtander ſoon perceived the moral of the ſtory; and *Creſimus* returned home, laden with the old *Roman* honour, BONUS CIVIS, BONUS AGRICOLA.

In a word, one may apply to induſtry what *Petronius* ſaid of the inchantreſs *Enothea*:

Quicquid in orbe vides, paret mihi. Florida tellus,
Cum volo, fundit opes; ſcopulique atque horrida ſaxa
Niliades jaculantur aquas.

Whate'er thy eye contemplates is my child.——
Deck'd by my care refulgent nature ſmil'd;
Earth at my touch exerts her beauteous pow'rs,
Inrob'd in verdure, and inſtarr'd with flow'rs:
Sooth'd by my arts, th' obdurate rocks comply,
And a new *Nile* falls thund'ring from on high.

But *Statius* has given us a more pleaſing and animated picture of good culture and induſtry in his poem, intitled, *Surrentinum Pollii:*

Hic favit natura locis, hic victa colenti
Ceſſit, & ignotos docilis manſuevit in uſus.
Quæ nunc tecta ſubis, ubi nunc nemora ardua cernis,
Hic nec terra fuit. Domuit poſſeſſor, & illum
Formantem rupes, expugnantemque, ſecuta
Gaudet humus; nunc cerne jugum diſcentia ſaxa,
Intranteſque domos: Juſſumque recedere montem.
——Getici cedat tibi gloria plectri,
Et TU *ſaxa moves, & te nemora alta ſequuntur.*
——Vix ordine longo
Suffecêre oculi; vix, dum per ſingula ducor,
Suffecêre gradus. Quæ rerum turba? Locine
*Ingenium, an Domini mirer prius? * * * **
Hic præceps minus audet hyems; nulloque tumultu
Stagna modeſta jacent, dominique imitantia mores.
SYLV. Lib. ii.

And here, perhaps, the reader may remember, that, in the beginning of the preceding Eſſay, I declined tranſlating a beautiful paſſage from this poet; for no *Engliſhman* hitherto has had courage to give us an intire verſion of him. Thoſe who have done a little, ſoon found they had work enough upon their hands. But, as the preſent quotation relates to rural improvements, I have here given a faint

faint glimmering of his meaning, in a *manner* ſomething between a metaphraſe and a paraphraſe; which ſeems to me the only way of turning our poet ſucceſsfully into any modern language:

Nature comply'd with interceding *art*,
And half-way met her, to perform her part:
Pleas'd to admit an help-mate on the throne,
Extrinſic laws, and ſubjects not her own.
Where glitt'ring domes and rich plantations ſtand,
Was once a tract of rock, and not of land;
Induſtrious labours, vary'd and renew'd,
The ſtubborn genius of the ſoil ſubdu'd:
Earth follow'd, where th'improving hand requir'd;—
The quarry vaniſh'd, and the hills retir'd.
Boaſt not, O ORPHEUS, of thy moving ſong;
The rocks and foreſts round my POLLIUS throng,
From him receive their being and their fates;
Thoſe he diſplaces, and he theſe creates.
Eye-ſight ſcarce meaſures thy improvements bounds,
Foot-ſteps ſcarce wander o'er th' inchanting grounds.
Varieties augment the pleaſing toil:
The maſter we admire, and then the ſoil.
Here winters ceaſe to rage, and ſtorms to roar;
The placid waters ſleep along their ſhore;
For nature, ſeconded by art, deſign'd
T'expreſs the calmneſs of the owner's mind.

Once for all, induſtry is the *vis vivida* that animates agriculture, of which there cannot be a clearer illuſtration than in the following extracts from Mr. *Locke*.

"The *Americans* are rich in land, but poor in all the comforts of life. Nature has furniſhed them, as liberally as any other people, with what might ſerve for food, raiment, and delight; yet, for want of *improving their land by labour*, they have not one hundredth part of the conveniencies we enjoy; and

a king of a large fruitful territory there feeds, lodges, and is clad worſe than a day-labourer in *England.*" [b]

"Induſtry and labour make the far greateſt part of the value of things we enjoy in this world, and the ground that produces the materials is ſcarce to be reckoned in, as any, or, at moſt, a very ſmall part of it: So little, that, even amongſt us, land that is left wholly to nature, and that hath no improvement of tillage, paſturage, planting, &c. is called (as indeed it is) *waſte:* And we ſhall find the benefit of it amount to little more than nothing." [c]

Nothing ſhews more ſtrongly the inattention and indolence of mankind, in general, with relation to new diſcoveries and improvements in huſbandry, than the remark I am going to make: Which is, that, wherever any ſucceſsful attempt of this nature is firſt made, there, and in a little diſtrict round that place, the practice remains, without extending itſelf far from the ſpot of its birth. Thus the place, or province, where the attempt began (and that attempt, perhaps, was purely the reſult of accident, or took its riſe from the enterprizing genius of ſome one particular man) is generally looked upon by us, as the ſpot of ground deſigned by nature for ſuch purpoſes; being, as it were, the only ſpot, excluſive of all others; when, at the ſame time, the improvement might be carried on to an higher degree of perfection, in an hundred parts of the ſame kingdom.

In

[b] On *Civil Government.*

[c] *Ibid.*

Every thing in the world is purchaſed by the labour of one perſon or other, and our wants and paſſions are the true cauſes of labour.

Trade, artizan-ſhip, and manufactures, are nothing more than a public ſtore-houſe of labour.

Hume's Essays, vol. IV. p. 15.

In proof of this, peat-aſhes are looked upon as a *Berkſhire* manure only, becauſe firſt made uſe of in that county, tho' I have found peat in abundance, and obſerved the aſhes to impart the ſelf-ſame good effects to the ſoil in counties that lie at 100 and 200 miles diſtance from *Berkſhire*. The culture of hops began firſt in *Kent*; and hops were then conſidered ſo much in the light of a provincial plant, that a whole century paſſed away, before cultivators had courage to raiſe them in *Eſſex*, *Hampſhire*, and *Worceſterſhire*.——The cuſtom of folding ſheep, as we have remarked before, and making uſe of wheel-ploughs, was found to be very advantageous in *Kent*, as long ago as in *Henry* VIIIth's time; but looked upon to be unprofitable, and even abſurd, in the ſame latitude of the ſame kingdom, and in fields and lands equally circumſtanced with thoſe where the improvements firſt took their riſe.—Thus, likewiſe, there is a little diſtrict in *France*, called St. *Briouc*, where huſbandry has been carried on for a century paſt to great perfection; and, though the adjacent parts of the province, where it is ſituated, enjoy a ſoil equally well conditioned, yet good agriculture has not paſſed the limits of a little circle about ten miles diameter.——I remember, when I was a youth, to have heard that venerable huſbandman, old *Jethro Tull*, declare, that, though he introduced turnips into the field, in King *William*'s reign, with little trouble or expence, and great ſucceſs, yet the practice did not travel beyond the hedges of his own eſtate, till after the concluſion of the peace of *Utrecht*.——In ſhort, we have all a hankering, more or leſs, to make *the horſe draw by the tail*, and not by the cheſt and ſhoulders.——This is owing not only to the force of prejudice, but a natural tendency to indolence, and a propenſity for admitting that ſort of induſtry (if there muſt be induſtry at all) which is moſt compendious.

In the next place, let me have the liberty of observing, out of justice to my own intentions, *that I no-ways recommend the new husbandry to farmers for raising corn*, as *such culture* will require more industry and attention than men of their occupation and cast of thinking either will have inclination to bestow, or can have leisure to bestow; nor am I quite clear that the profit will greatly counterbalance the expence and labour; but still I exhort them to copy the *new husbandry* in neatness, cleanliness, and extirpation of weeds: And recommend *it* strongly for the culture of horse-beans, field-pease, lucerne, sainfoin, fenugreek, woad, weld, hemp, flax, turnips, carrots, parsnips, winter-cabbages, with a long train of *etcæteras*.

Thus with more labour than I can, with any degree of reason, either expect or hope to be thanked for, I have imparted to the public the whole result of my experiments and observations on that very valuable and important plant, the LUCERNE. As to the work itself, I cannot make my apologies, or take my leave in a properer manner, than in the words of one of the fathers of *English* husbandry: Which I am the rather inclined to make use of, as our cases are as near as possible parallel, in regard to the nature, utility, and novelty of the subjects we have undertaken to write upon: For he introduced the culture of *hops* amongst us, and I am attempting to introduce the culture of *lucerne*.

REGINALD SCOTT'S "EPILOGUE to the reader."

"Thus have I, according to my small skill and experience, according to my friends desires, and according to the truth, uttered these few notes concerning the making and maintenance of an *hop-garden*. That which remaineth more to be said thereof, resteth in the skill of skilfuller persons, and is, at this time, either beyond the compass of my knowledge,

ledge, or beyond the reach of my memory. I doubt not but I have herein ventured to teach ſome *that* which they know better than I; and alſo provoke [incite] ſome that need not, and ſome that care not to be employed in theſe matters. Howbeit, I urge nothing but *that* which may be done without great difficulty, charge, labour, or ſpoil." [d]

N. B. That the reader may not make a miſtake in the moſt material part of this undertaking, the author, from his own experience, as well as frequent obſervations made by others, begs to put him in mind, that a *pound* of ſeed ought to be allowed to every *four* perches in the nurſery; and that the ſeed ought to be ſown in calm weather, and diſperſed in ſowing, as equally as may be.

[d] *Perfect Plat-form of an Hop-garden*, 4°, 1576, p. 60.

POSTSCRIPT.

AS the Author, during the years he has made his experiments on LUCERNE, *made alſo experiments upon moſt ſorts of vegetables, (native plants of* England, *or foreign ones) which afford wholeſome, well-taſted, nouriſhing food for cattle, he would be glad to receive aſſiſtances, founded upon experience and matter of fact, relating to the following articles, which have been the objects of his conſideration.*

(1.) ACACIA.
(2.) AIRA-GRASS.
(3.) ALAGAROBALE. (The *Spaniſh*; called, in *Spain, Valencia.)*
(4.) AMEL-CORN. (Cut green for cattle.)
(5.) ANTHOXANTHUM.
(6.) ARROW-HEADED GRASS.
(7.) BUCK-WHEAT. (Cut green for cattle; or the dried grain mixt with oats.)
(8.) BURR-REED.
(9.) BURNET.
(10.) CALEVENCHES.
(11.) CANARY-GRASS.
(12.) CICELY. *(Wild.)*
(13) CLOVER. *(Broad.)*
—— *White Dutch*, or *German.*
—— *Hop.* (With Trefoils in general, *Engliſh* and foreign.)
(14) COW-WHEAT.
(15) CYPERUS-GRASS.

(16)

(16) Cytisus *falsified*: Or, *Bastard-Senna*.
(17) Fenugreek. (*Sweet, Italian.*)
(18) Festuca-Grass.
(19) Fox-tail Grass.
(20) Furze. (Young and chopped green.)
(21) Guinea-Grass. (*Jamaica.*)
(22) Kidney-Vetch.
(23) Knot-Grass.
(24) Ladies-Mantle.
(25) Lentils.
(26) Lucerne.
(27) Lupines.
(28) Maddington-Grass.
(29) Maize.
(30) Marle-grass. Marygolds. (*Green.*)
(31) Melilot. (*Sweet, Italian.*)
(32) Millet.
(33) Moon-Trefoil.
(34) Plantain. (Narrow-leaved.)
(35) Parsley.
(36) Pea of Grace: Or, *German* Sheep-Pea.
(37) Pea Earth-Nut.
(38) Phleum.
(39) Ray-Grass.
(40) Sainfoin. (Sown with corn, drilled, or transplanted.) *Spanish* Sainfoin, and Esparcette.
(41) Silver-Weed, or Wild Tansey.
(42) Sophora. (*North-American.*)
(43) Spurrey.
(44) Tribolo, or Trifoglio Cavallino. Horse-Trefoil, *Tuscan*.
(45) Trifolium *Fibrinum*[d].

(46)

[d] This remarkable vegetable, not to be found in any Herbals that I have seen, is of the lucerne, or trefoil kind, but larger than lucerne, and well-tasted. It grows wild in *Stiria, Carniola, Carinthia, Friuli, &c.* and, mixed with five other moun-

tain-

(46) TIMOTHY-GRASS. (*Ireland, Jamaica*, &c.)

To theſe may be added the *herbage* of ſome plants raiſed in the field, for the ſupport of cattle in winter: As,

(47) COLLIFLOWER BROCOLI; SAVOYS; *Brown Winter Cabbage*, *&c.* And alſo eſculent roots for the ſame purpoſe: As,

(48) CARROTS.

(49) *German* TURNIP-CABBAGE; or KAHL-REUBEN.

(50) NAPPER; or *Swediſh Turnip*.

(51) PARSNIPS.

(52) POTATOES.

(53) TOPINAMBOURS °.

Now, that new ſorts, or varieties of ſome, if not all theſe uſeful plants may be better procured from abroad by ſuch perſons as are deſirous to make experiments on them, the Curious may not be diſpleaſed (when they write in queſt of them) to learn the foreign names given them at preſent, and for two or three centuries back, in the various parts of Europe; *and that, ſo far at leaſt, as it was in my power to collect them. I have alſo included, in a parentheſis, the* Latin *names made uſe of by modern botaniſts.*

AMEL-CORN. (Zéa.) Eſcourgeon, Eſpautre, *French.* Ammilkorne, *German.* Zea, Spelta, Biada, and Pirra, *Italian.* Spelta, *Spaniſh.*

ANTHOXANTHUM.

tain-herbs, makes a medicinal tea, for thinning the blood, of a very pleaſant taſte. The phyſicians of the countries abovementioned preſcribe it always under the name of *trifolium fibrinum*. I made a drawing of the plant at *Gratz*, and have all imaginable reaſons to think it will afford excellent, as well as abundant food for cattle.

° An eſculent root for men and cattle, cultivated, gathered, and preſerved like potatoes. It is the *helianthemum tuberoſum Indicum*, or *corona ſolis tuberoſa radice*.—A ſort of *Jeruſalem* artichoke.

ANTHOXANTHUM. Prim-Graſs, *Tuſſer*, 1577. Vernal-Graſs, *Ray*, 1680.

BUCK-WHEAT. (Fagopyrum.) Dragée au chevaux, Blé de Sarraſins, *French*, Heydonkorne, *High-German.* Bochweidt, *Low-German.*

CLOVER, *Broad.* (Trifolium majus ſativum.) Grand Trefle, & vray Trefle, *French.* Trifolio, *Italian.* Trevol, *Spaniſh.* Groote Claveren, and Spaenſch Claveren, *Low German.* Klee and Vuiſenklee, *High German.*

CANARY-GRASS. (Phalaris.) Panic, *French.* Pfenich and Heidel-pfenich, *German.* Panico, *Italian.* Panizo and Paniſo, *Spaniſh.*

CYTISUS *falſified*, or baſtard Senna. (Cytiſus Maranthæ.) Baguenaudieres and Baguenaudes, *French.* Linſen Welſch, Lombartſhe-Linſen, and vulgarly Senebroome, *High* and *Low Dutch.* Cytiſo, *Italian.*

FENUGREEK. (Fœnum Græcum, Trigonella.) Fenugrec & Senegre, *French.* Bochſhorne, or Kuhorne, *High German.* Fiengreco, *Italian.* Alfornas, and formerly Alholvas, *Spaniſh.* (This is the Siliqua of *Columella.*)

FOX-TAIL GRASS. (Alepocúrus.) Qüeue de Renard, *French.* Voſſen Steert, *Low Dutch.*

KIDNEY-VETCH. (Anthyllis.) Tanaſie ſauvage and argentine, *French.* Grenſerich and Ganſerich, *German.* Antyllide, *Italian.*

KNOT-GRASS, (Polygonum.) Renouée & Corrigiole, *French.* Weygraſs and Weytrit, *High Dutch.* Wachgraſs, Verkenſgraſs, and Duyſent knoop manniken, *Low Dutch*; as alſo Knawel, i. e. Knot-weed. Polygono maſchio and Corrigiola, *Italian.* Corrigola and Gailis, *Spaniſh.*

LADIES-MANTLE. (Alchemilla.) Pié de lion, (hence the *Engliſh* Pedelion) & Aſpergoutte, *French.* Synnan, Lewentaupen, and Lewenfuſz, *High Dutch.* Onſer Frawen mantel, and Gros Sanickel,

nickel, *Low Dutch.* Stellaria and Alchemilla, *Italian.*

Lucerne. (Medica.) Lucerne and Trefle aù Limaiſon, *French.* Gedraite Claveren, and Spaënſch Claveren, *Low Dutch.* Medica, *Italian.* Alfalfé, Ervay, and Alſalfá (from the *Mooriſh* Alſaſafat) *Spaniſh.*

Lupines. (Lupinum.) In *French* as in *Engliſh.* Feigbonen, *High Dutch.* Lupinen, Vyckboonen, and Wolffbonen, *Low Dutch.* Lupino domeſtico. *Italian.* Entramuces and Entramocos, *Spaniſh.*

Marygolds. (Caltha, vulgo Calendula.) Souci, *French.* Ringelblumen, *High Dutch.* Goutbloemen, *Low Dutch.* Maravilha, *Spaniſh.* Caltha, and Fior rancio, *Italian.* As it blows every month, it is alſo called *Fior d'ogni meſe (the flower of every month.) The flower of the calends* (Calendula; and, as it turns towards the ſun from morning to evening, it is called *Spoſa del ſole (the ſun's wife;)* and *Horologio de i cittadini (the citizens clock)* Italian.

Melilot. (Melilotus.) In *French* as in *Engliſh*; and alſo Melilot d' Italie. Ghemeyne, *Low Dutch.* Meliloto, *Italian.* Corona di Rei. *Spaniſh.*

Millet. (Milium.) In *French* as in *Engliſh*; and alſo Mil. Kirſz, *High Dutch.* Miglio, *Italian.* Milho and Miyo, *Spaniſh. (N. B.* There is another Millet, of the *Indian* kind, mentioned by *Virgil* and *Pliny*, called, by the *Italians*, Sorgho, Miglio Indiano, Sagina, and Melago; and by the *Germans*, in the hereditary dominions of the Houſe of *Auſtria*, Sorglamen.)

Plantain, Ribbed. (Plantago quinquenervia.) Petite Plantaine, Lanceole and Lanceolette, *French.* Spitzer wegrich, Clein wechbree, Kentſribbe, and Uvegerich, *High* and *Low Dutch.* Plantagine, *Italian.* Llanthem, and Tarnelagen, *Spaniſh.*

Ray-Graſs. (Gramen avenaceum, elatius, longa juba ſplendente.) Yvray, Gaſſe, Fromental, Chien-

dent & faux ſiégle, *French.* Tuvalch treſpe, & ruenveiſſen, *German.* Loglio and Gioglio, *Italian,* Yoyo, *Spaniſh.*

Sainfoin. (Onobrychis, Hedyſarum.) Sainfoin, Eſparcette, & Bourgogne, *French.* Onobrichi, *Italian.*

Spurrey. (Spergula.) Spergule & Eſpargoule, *French.* Spury, *German.*

Trefoil, Horſe. (Trifolium odoratum.) Sibengezeit and Wolriech enderklee, *German.* Tribolo and Trifoglio cavallino, *Italian.*

Turnip-Cabbage. Kahl-reüben, *German.*

Turnip. (Meadow.) Napper, Swediſh.

Vetch. (Vicia.) Veſce & Ers, *French.* Wicken and St. Criſtoffels kraut, *German.* Veccia, Afaca, *Italian.*

New experiments, or improvements, relating to the culture of lucerne, or any other of theſe plants, (ſuppoſing them to be raiſed in Engliſh *fields, and not in gardens) may be tranſmitted to the Author by means of the bookſeller: but, at the ſame time, it is determined to publiſh no account, except correſpondents ſign their names and places of abode, that doubts may be cleared and difficulties ſolved by the intercourſe of letters, and acknowledgments made for aſſiſtances received.*

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